THE IRON TRADE REVIEW

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# Melters Are Looking to the Future

## General Electric Sends Out Inquiry for Large Tonnage—Extreme Heat Interferes With Plant Operations

OPERATIONS of the Steel Corporation continue at about 95 per cent of ingot capacity. Extreme heat during the past few days has resulted in curtailment of operations at some plants. The government has placed its first order for rails for its Alaskan railroad, 5,000 tons, to be rolled by the Colorado Fuel & Iron Co. The Seaboard Air Line has ordered 7,000 tons from the Tennessee company.

**Iron Ore**

The movement of iron ore from the Lake Superior region continues very heavy and no trouble will be experienced in exceeding a movement of 45,000,000 tons for the season. It is probable that the price of ore for next year's delivery will be fixed at an unusually early date this year and that an advance of at least 50 cents a ton will be made. Some additional round lots of ore have been sold or are about to be sold to eastern buyers.

**Pig Iron**

The buying of 35,000 tons of basic by the Lukens Iron & Steel Co., at from $17 to $17.25, delivered, for the first quarter of next year, was the leading transaction in the pig iron market, which is rather quiet, as sellers are not encouraging the placing of orders at this time. The General Electric Co. sent out an inquiry for 32,600 tons of various grades for delivery extending into next year. This is taken as indicating the desire on the part of important melters to protect themselves through the first half of 1916. Some high prices are being named for that delivery, at Buffalo and elsewhere, but very little actual business is being done.

**Machinery**

The English government has been active during the past week in buying all the shell-size lathes that could be found available for this year's delivery. It is not thought, however, that the number was large, as the demand for this type of lathe has been very active. Some buying in shell-making equipment is now being done for next year by both domestic and foreign buyers. Railroads are not doing much buying of machine tools. Numerous orders for cranes are being placed. It is estimated that the machinery required for the new additions to the plant of the Bethlehem Steel Co. will cost from $1,500,000 to $2,000,000.

**Coke**

The Kentucky Solvay Coke Co. have made a contract to furnish the Marting Iron & Steel Co., Ironton, O., 150,000 tons of coke per year over a period of five years, on a sliding scale basis. The coke market is somewhat stronger, but is not very active.

**Bars**

Many inquiries for steel bars for the manufacture of shrapnel are being received and it is estimated that from 150,000 to 175,000 tons are pending in eastern territory. Among the orders recently placed are from 12,000 to 14,500 tons by a frog and switch manufacturer, and 16,500 tons by the Cleveland Hydraulic Pressed Steel Co. The latter company has not yet closed for the second lot of 2,500,000 shells.

**Warehouse Business**

For a number of months, business of leading warehouses has steadily increased, and the first half of September has made a highly gratifying showing. Prices on leading products have been advanced in Chicago, St. Louis, St. Paul and Cincinnati. Recent advances in other cities are being firmly maintained.

**Tubular Goods**

Inquiries for cast iron pipe for export, including one for 10,000 tons for South America, are attracting more attention and some of this business is likely to be placed soon. The East Ohio Gas Co. will purchase about 7,000 tons of steel pipe for a line from Canton to Youngstown.

**Plates and Shapes**

The government will purchase 11,000 tons of plates for use in its different navy yards. The demand for structural shapes is improving and fabricating prices are not so low.

# THE OPEN HEARTH

## Lame Diplomacy

AMERICAN manufacturers are the owners of millions of dollars worth of German-made goods which are lying on docks in Europe, deteriorating because the British and French have declared a commercial blockade of the Teutons. Practically all of these products came into legal possession of Americans prior to March 1, when the order-in-council of the allies went into effect.

Some American importers have already taken the precaution to file claims for damages against the British government, knowing full well that such claims, if acknowledged, will not be paid during the present generation. Other importers have had the courage and resources to employ attorneys to go to London in their behalf and petition for the release of the goods which are legally theirs. In a number of instances, shipments belonging to the latter have been released by the British, and they are now coming over. The fact that private attorneys of American interests have been successful where American diplomats have failed goes to support the claim that the diplomatic service of the United States has been impractical and needs to be more business-like and firm in its dealings with countries which hamper free commerce with the United States.

The British have ruled that the order-in-council shall be interpreted to mean that no goods of German origin can come forward which had not been paid for and the money actually changed hands previous to March 1. Due to the modern way of transacting business, a great majority buy goods under contract, f. o. b., and a legal obligation is incurred just as soon as the goods are delivered at a railroad station. American diplomats were unsuccessful in their attempt to persuade British authorities that where an obligation to pay had been assumed by American interests prior to March 1, and in good faith on the part of both the German producer and the American customer, the goods should be allowed to come forward. Private attorneys, however, have been successful since in doing just this. As it happens that some of these private attorneys were formerly in the service of the state department assigned to matters upon which they are now working in their private capacity since resigning from public office, the conclusion is natural that something is inherently wrong with the diplomatic service of the United States.

In the past, this work has been handled by trade advisers of the state department. The work has been directed chiefly by them. The trade advisers were appointed under the direction of William Jennings Bryan, who evidently did not give so much consideration to efficiency as he did to party fealty. One of these advisers has resigned since Mr. Bryan retired from the portfolio of state. He found more lucrative employment in the service of American importers who had insistently requested aid of government agents in obtaining releases for their goods under the order-in-council. This position in the state department has not yet been filled. It is sincerely hoped that Secretary of State Lansing will continue to live up to his justly high reputation and designate a man who possesses the knowledge, force and ability that heretofore have been so sadly lacking in the office of the trade advisers.

## Pig Iron Prices

THE failure of southern pig iron to develop the strength that had been expected in some quarters has suggested the possibility that melters have bought beyond their requirements for the remainder of this year and that prices will be weaker before Jan. 1. It is also intimated that the same condition may be true in regard to northern foundry grades. The statistics of pig iron production for August show not only that two-thirds of the gain is due to non-merchant stacks, but also that many merchant stacks can quickly be blown in to meet increased demand. It certainly is true that the demand for foundry grades has not increased as has that for steel-making grades, but it will not do to count too strongly on idle stacks being blown in. Many of these stacks are isolated, can be run only at high cost of production and are not of large capacity. It is also true that if the demand for steel-making irons continues during the next few months as it has during the past three or four months, some of the idle stacks which usually make foundry iron will be put on basic or bessemer. Hence the foundryman who has not covered for his requirements for the first half of next year will do well not to hesitate long, for there is danger that he will overstay the market.

## Amazing McAdoo

RANKING in great importance as a part of the legislative program next winter is merchant marine legislation. Secretary of the Treasury McAdoo, in his recent report to the President on the Pan-American financial conference, indicated that he will attempt to have the government ship purchase bill pressed for passage. In view of the open hostility to the bill among those who are ordinarily supporters of the administration and because of its having been filibustered to death at the last session, Mr. McAdoo's proposal is amazing. Furthermore, the referendum

# THE OPEN HEARTH

taken during the summer by the chamber of commerce of the United States was overwhelmingly opposed to the bill. It denoted plainly that the business interests of the country want really constructive merchant marine legislation enacted so that the United States can be placed on a par with foreign country in building up a great overseas trade. The next congress will be forced to pass this kind of legislation or none at all.

## Workingmen and War

THE announcement that the British trade union congress, in session at Bristol, Eng., last week, adopted a resolution, expressing belief in the complete justification of the position of Great Britain and her allies in the war is the latest indication that a very large percentage of the British workingmen is loyal to the government. It is true, however, as recently pointed out by one of our British exchanges, that, owing to the speeding-up policy adopted in England within the past few years in order to meet the competition of Germany and the United States, many of the working people imagine they have a grievance, and they also cite the increase in the cost of living without corresponding increase in wages as another grievance. The truth is that politicians have coddled and catered to labor agitators for so long that it is not surprising that all of the workingmen are not ready to fight for their country.

The principal opposition to the war comes from the independent labor party, which is the socialist wing of the labor party as represented by six of the 40 labor members of parliament. Even as late as Aug. 3, 1914, when the immense stop-the-war meetings were held all over England, these working parties and the Society of Friends were solid in opposition to militarism and war. For the most part, however, the working people have done their part, and recent proclamation of labor parties declares that the victory of Germany would mean that "working class aspirations for greater political and economic power would be checked, thwarted and crushed, as they have been in the German empire." Be it said to the credit of a large number of the workingmen, including many trade unionists, that they have joined the colors, while many others have cast aside union regulations and are working 70 hours or more a week on government contracts.

In this country, the conduct of workingmen since war was declared has been highly commendable. Naturally there have been a few strikes following the announcement of large contracts and immense profits at some of the plants, but for the most part employers have anticipated the requests of employes by granting increases in wages, or shorter hours, or both. The action of Dr. Dumba, the ambassador from Austria, in trying to stir up trouble in American plants has given Hungarian and other workingmen an opportunity to display their loyalty and they have done this in public meetings in New York, Boston, Cleveland and other cities. They have shown their feelings even more plainly by sticking to their jobs. The attempt of this ambassadorial busy body to paralyze American industries engaged in perfectly legitimate business has been met very properly by prompt action on the part of the administration and his speedy departure from this country may be confidently expected. Ambassadors who meddle in the affairs of countries to which they are accredited may expect to meet with the fate which has overtaken Dumba. Even when a foreign government may feel that there is some justification for the action of its ambassador, it is customary to grant the request of a country which states that a certain man is no longer persona grata. Hence it is not at all probable that the Austro-Hungarian government will hesitate to recall Dumba. Prompt action is especially important at the present time when the diplomatic relations of the United States and the Teutonic allies are somewhat strained.

## Orientals in Command

AT THE recent hearing of the federal trade commission on the Pacific coast, Andrew Fureseth, the labor leader who for years advocated the passage of the seamen's bill, declared that if orientals continue to drive the English-speaking races off the sea, the time will come when orientals will be on the bridge in command of American ships. He added that history would repeat itself, that the nation which manned the ships which sailed the seas ultimately would control the merchant marine and the world. That nation, he said, would be oriental.

It is true that orientals will be on the bridge, but they will not be in command of American ships, for American ships are being sold on account of the unfair provisions of the new law, and orientals are not only commanding, but buying American ships. H. H. Raymond, president of the Clyde Steamship Line, recently sent to the department of justice a letter protesting against the law. He said that no uniform set of inflexible rules can be devised and made applicable to a shipping of such a diversified character as that of the United States without having disastrous consequences. Thus the testimony in regard to the injustice of the law is piling up and we trust that the report is true that President Wilson has ordered an investigation of the law by the department of justice to determine whether its effect on American shipping or its relation to other laws on the same subject make amendments necessary. If a thorough inquiry is made, ample reason for important changes will be found.

## Prices Present and Past

*Quotations on leading products September 15, average for August, 1915, average for June, 1915, and average for September, 1914. Prices are those ruling in the largest percentage of sales at the dates named.*

| | Prices Sept. 15, 1915. | Average for Aug., 1915. | Average for June, 1915. | Average for Sept., 1914. |
|---|---|---|---|---|
| Bessemer pig iron, Pittsburgh.. | $16.95 | $15.89 | $14.58 | $14.90 |
| Basic pig iron, Pittsburgh..... | 15.95 | 14.89 | 13.54 | 13.90 |
| No. 2 Fdy. pig iron, Pittsburgh | 15.45 | 14.70 | 13.45 | 13.90 |
| Northern No. 2 Fdy., Chgo.... | 14.25 | 13.38 | 13.00 | 13.50 |
| Lake Superior Charcoal, Chgo.. | 16.25 | 15.75 | 15.25 | 15.75 |
| Mall., Bess., Chgo..... | 14.75 | 13.38 | 13.00 | 13.50 |
| Southern No. 2, Birmingham... | 11.00 | 11.13 | 9.55 | 10.00 |
| Southern Ohio No. 2, Ironton.. | 14.00 | 13.69 | 12.50 | 13.00 |
| Basic, eastern Pa..... | 17.25 | 15.25 | 13.75 | 14.00 |
| No. 2X Virginia furnace..... | 13.25 | 12.50 | 12.50 | 12.50 |
| No. 2X foundry, Philadelphia.. | 16.25 | 15.50 | 14.25 | 14.25 |
| Ferro mang., Balti., (prompt).. | 115.00 | 105.00 | 105.00 | 80.00 |
| Bessemer billets, Pbgh..... | 25.00 | 23.00 | 19.87 | 21.00 |
| Bess. sheet bars, Pbgh...25.00 to | 26.00 | 24.00 | 20.37 | 22.00 |
| Op.-h'th sh. bars, Pbgh...26.00 to | 26.50 | 25.00 | 20.37 | 22.00 |
| Open-hearth billets, Pbgh..... | 26.00 | 24.00 | 19.87 | 21.00 |
| Steel bars, Chgo..... | 1.54 | 1.49 | 1.39 | 1.38 |
| Steel bars, Pittsburgh..... | 1.35 | 1.30 | 1.20 | 1.20 |
| Iron bars, Philadelphia..... | 1.45 | 1.30 | 1.20 | 1.20 |
| Iron bars, Cleveland, local del'y. | 1.30 | 1.22 | 1.20 | 1.20 |

| | Prices Sept. 15, 1915. | Average for Aug., 1915. | Average for June, 1915. | Average for Sept., 1914. |
|---|---|---|---|---|
| Iron bars, Chgo. mill..... | $1.35 | $1.23 | $1.15 | $1.07 |
| Beams, Chicago ..... | 1.54 | 1.49 | 1.39 | 1.38 |
| Beams, Pittsburgh ..... | 1.35 | 1.30 | 1.20 | 1.20 |
| Beams, Philadelphia ..... | 1.509 | 1.409 | 1.359 | 1.30 |
| Tank plates, Pittsburgh..... | 1.35 | 1.30 | 1.15 | 1.185 |
| Tank plates, Chicago..... | 1.49 | 1.44 | 1.31 | 1.38 |
| Tank plates, Philadelphia..... | 1.509 | 1.409 | 1.359 | 1.30 |
| Sheets, blk., No. 28, Pbgh..... | 1.90 | 1.83 | 1.80 | 1.95 |
| Sheets, blue an., No. 10, Pbgh. | 1.50 | 1.36 | 1.35 | 1.40 |
| Sh., galv., No. 28, Pbgh., nom. | 3.75 | 3.93 | 4.46 | 2.95 |
| Wire nails, Pittsburgh..... | 1.65 | 1.61 | 1.55 | 1.55 |
| Connellsville fur. coke contr... | 1.75 | 1.75 | 1.65 | 1.75 |
| Connellsville fdy. coke, contr... | 2.40 | 2.25 | 2.25 | 2.35 |
| Heavy melting steel, Pbgh..... | 14.75 | 13.38 | 11.75 | 11.44 |
| Heavy melting steel, east'n Pa. | 15.00 | 13.75 | 11.25 | 10.75 |
| Heavy melting steel, Chgo..... | 12.00 | 11.50 | 9.37 | 9.37 |
| No. 1 wrought eastern Pa..... | 16.50 | 15.25 | 13.00 | 12.50 |
| No. 1 wrought, Chgo..... | 10.75 | 10.12 | 8.75 | 8.31 |
| Rerolling rails, Chgo..... | 13.50 | 11.75 | 10.00 | 10.87 |
| Car wheels, Chgo..... | 11.75 | 11.38 | 9.87 | 10.75 |

(For Additional Prices See Page 552.)

# Big Sale of Basic Pig Iron is Made

### Lukens Iron & Steel Co. Closes for 35,000 Tons—Others Expected to Come Into the Market—Sellers in Control and Not Urging Buying

Philadelphia, Sept. 13.—Chief interest in the pig iron market in this district in the week has centered in the purchases of basic by the Lukens Iron & Steel Co. for delivery principally through the first quarter. This buyer is known to have closed for about 35,000 tons, divided among four eastern Pennsylvania makers, and in addition took 1,500 tons of off-basic from a New York state furnace. The prices ranged from $17 to $17.25, delivered, the greater part of the first quarter iron having been closed at the higher figure. One lot of 10,000 tons for first quarter was taken from one maker under rather special circumstances at $17, delivered, as were also several thousand tons from another producer for this year. There is an unconfirmed report that a block of iron was obtained from valley makers, which is not credited generally. The prices realized for the first quarter, while fixing a new high mark in eastern basic for this movement, did not reach the original expectations of makers. This appears to have been due to unexpectedly severe competition from one eastern producer and also to the fact that valley basic was quoted considerably under $18, delivered, the rate to Centerville being about $2.75. Requirements of other eastern basic consumers now are expected to come up for attention.

The market in foundry grades has been uneventful and rather quiet, as consumers appear to be going slowly in accepting the advanced prices asked for next year. The makers, however, are standing firmly by their higher schedules. For standard No. 2X for this year, $15.50, eastern Pennsylvania furnace is the lowest offered. First quarter prices are around $16.50, furnace, though still not clearly defined. One Virginia maker who has been an active seller lately, has out a new schedule, 25 cents up, for the year, which quotes $13.50, furnace, for No. 1X, $13.25 for No. 2X and $13 for the lower grades. A sale of 1,000 tons of Virginia iron for first quarter was made in this territory at $14, furnace, or $16.75, delivered, for No. 2X. Low phosphorus is active and very strong. Standard iron is quoted at $24.50, Philadelphia, upward, depending on delivery. Lebanon makers name $20, furnace. The Bethlehem Steel Co. recently bought 3,000 tons of standard and a Chrome, N. J., buyer 1,500 tons of Lebanon iron. A 4,000-ton inquiry for the General Electric Co. will go to Lebanon makers. The monthly meeting of the Eastern Pig Iron Association the past week revealed a liberal increase in orders in August and a further decline in stocks. An important eastern Pennsylvania steel maker who has been a leading seller of iron is out of the market on standard grades for this year, and has only off lots from stock to offer.

#### General Electric Inquiry

New York, Sept. 14.—A large inquiry from the General Electric Co., calling for 32,600 tons, has attracted unusual interest in the market, not only for the tonnage involved, but for the various delivery options asked, which tend to indicate that leading consumers are desirous of protecting themselves on all contingencies for distant periods. The inquiry calls for 17,600 tons of high silicon foundry, 5,700 tons of medium silicon, 2,600 tons of low silicon, 2,700 tons of malleable and 4,000 tons of low phosphorus for shipment to Lynn, Everett, Pittsfield, Schenectady and Erie. On deliveries, options are asked for all of 1916; for the first half of 1916, or for the rest of the present year and for first half. The International Steam Pump Co., which had asked 11,500 tons, principally foundry for first half for various plants, has placed this business. A New Jersey

(For complete prices see page 552.)

buyer closed for 2,000 tons, a Connecticut shop for 1,000 tons, both for next year, and a Whitinville, Mass., consumer for 2,000 tons for this year. Scattered business has been good. In their total, however, sales of the past week in this district have been lighter and the market now is less active. Prices generally are strong. The tidewater market for this year now is at $16.25, upward, or $15.50, eastern Pennsylvania, for No. 2X. Next year's trading has been at $17 to $17.50, tidewater. Buffalo iron, for this year, is around $15.50 and sales of No. 2X for next year have been made at $16, furnace, while more has been paid for the higher silicons. A leading Buffalo maker in the week put out a new first quarter schedule of $15.50 for No. 2X, $15.25 for No. 2 plain and $15 for Nos. 3 and 4. For iron over 3 per cent and malleable, $16, and for over 4 per cent, $16.50, is asked. Export business the past week has been quiet and the inquiry now pending is smaller.

### Pig Iron Cost Problem

Buffalo, Sept. 14.—Furnace interests of the Buffalo district are influenced in their consideration of inquiries for iron for deliveries into 1916 by the uncertainty existing as to the advances likely to occur in the cost of production. The coke, the ore and other elements involved present aspects indicative of a possible increase over existing levels on which selling prices are computed. Some authorities are inclined to the belief that the production cost is apt to be advanced fully $2.50 per ton over the present cost.

With all but one of the producing interests practically sold up over the remainder of the year, there is little disposition on the part of furnaces to take on to any great extent contracts for iron for delivery into 1916 except at prices at which a loss would not be sustained in the event of the contemplated production cost advances becoming effective.

Sales for the week have been somewhat lighter than in the past few weeks, although the General Electric Co. inquiry for 30,000 to 35,000 tons of foundry grades, low phosphorus and malleable irons in being considered has had a stiffening effect on the market. A sale of special iron equivalent to No. 2 plain for delivery over the remainder of the year and into the first two months of 1916, involving about 1,000 tons, has been booked here at $17, f. o. b. furnace. This, however, does not exactly represent the market, as the range irrespective of grade differentials for last quarter deliveries on iron available is $15 to $16, with $15.50 more closely representing the minimum. Basic is firm here at $16 and the interests sold up are asking $16 to $17 for possible available tonnages.

### Basic Sells at $15, Valley

Pittsburgh, Sept. 14.—A local steel company has purchased 2,000 tons of basic iron for prompt delivery at $15, valley, and another consumer has closed for 1,000 tons at the same price. These transactions establish this grade at $15, flat. Several lots of bessemer iron have been sold at $16. While a number of quiet inquiries are pending, yet the market is not nearly so active as it was a few weeks ago. Some pig iron market leaders express the belief that continued rapid market advances will not benefit the trade. No. 2 foundry and malleable are offered at $14.50, valley, by some leaders, but others are asking $15 for both prompt and future delivery. Specifications for foundry grades are heavier, although some melters are not taking anything like normal tonnages. The Sharpsville furnace is being prepared for the torch and will come in on basic.

### Not Urging Buying

Cleveland, Sept. 14.—Furnaces are not urging the buying of pig iron for next year's requirements and as melters are pretty well covered for this year there is not much buying at present. Prices at Toledo are firm at $14.50, furnace, for this year and $15 for the first half of next year on No. 2 foundry and malleable.

### Market Retains Strength

Cincinnati, Sept. 13.—The pig iron market remains quiet, but it has not lost any of the strength that has characterized it for the past two months. Sales are low, as the majority of melters are covered for the last quarter, and are awaiting developments before contracting for the first half. In some cases, buyers have taken sufficient iron for the last half to run them through the first quarter. A few small sales have been made for the first quarter at $12.50, Birmingham basis, for southern No. 2 foundry, and at $15, Ironton basis, for southern Ohio No. 2 foundry. Inquiries before the market include 500 tons of foundry iron from the Louisville & Nashville railroad for prompt delivery; 500 tons of foundry iron from the Nordyke & Marmon Co., Indianapolis, for the first quarter; 100 tons of malleable iron from the Barney & Smith Car Co., Dayton, O.; and 1,500 tons of foundry iron from the Baltimore & Ohio railroad, part of which will go to Newark, O., and part to Baltimore. Recent sales include 500 tons of southern iron for shipment in this territory to extend through the first quarter, at $12.50, Birmingham basis, for No. 2 foundry, and 2,000 tons of malleable iron, also for delivery in this vicinity. Prices are unchanged. Southern No. 2 foundry is quoted at from $11 to $11.50, Birmingham, for prompt delivery, and at $12.50 for the first quarter of next year. Southern Ohio No. 2 foundry is given at from $14 to $14.50, Ironton basis, for this year's delivery, and at $15, for the first half of next year. Silvery iron is holding at from $17 to $17.50, furnace for 8 per cent silicon, and Virginia No. 2X is quoted at $14, furnace, for either the last or first quarters. Speculators, who are holding about 50,000 tons of southern iron, are refusing to sell at present quotations.

### Chicago Iron Advanced

Chicago, Sept. 14. — With unusually large sales during August, more than 120,000 tons of pig iron having been disposed of in the Chicago district during that month, and with furnace stocks at a low ebb, every condition is pointing toward a higher price on foundry, malleable and basic iron.

Present conditions indicate that it would be difficult to obtain northern No. 2 foundry at less than $14.25, Chicago furnace, and various makers will quote figures from that to $14.75, furnace. Malleable is scarcer than foundry iron and the minimum on this grade is believed to be $14.75, Chicago furnace, although some makers will not part with their iron for the remainder of this year at less than $15.25. These quotations are subject to a premium of at least 50 cents for delivery during first quarter and first half.

A feature of the present market is an unexpected demand for basic iron, possibly stimulated by the strengthened condition of foundry and malleable and while no sales have been made to fix a price, it is believed $14.75, Chicago furnace, would be difficult to shade materially.

As an indication of the sold-up condition of furnaces an inquiry for more than 5,000 tons of basic is now before the market and makers for the most part are unwilling to entertain it. This is because it would practically exhaust their capacity and in the face of a rising market they would rather sell in smaller lots.

Considerable inquiry is now current, totaling perhaps 20,000 tons of all grades, prominent among which is a fair tonnage of basic. This basic inquiry is from plants in Chicago as well as in the East St. Louis district. A concern

*(For complete prices see page 552.)*

at Whiting, Ind., is asking prices on 700 tons of southern foundry and a South Bend concern desires prices on 600 tons of high silicon.

Southern iron is quiet with comparatively little inquiry and practically no sales, the minimum appearing to be $11.50, Birmingham, for the present year.

### Stiff Prices at St. Louis

St. Louis, Sept. 13.—The most interesting feature of the local iron market is an inquiry for 1,000 tons of malleable, a number of inquiries for small tonnages, and a general stiffening of prices, which leads local sales agents to believe that better times are in sight. Nearly all local agents are holding out for $12.50 for southern No. 2, f. o. b., Birmingham, for delivery over the remainder of the year, and some are asking $13 for first quarter and first half delivery. Northern malleable has advanced to $15, Chicago furnaces, and $14.50, Ironton.

### Not Much Activity

Birmingham, Ala., Sept. 13.—The southern market is without development. Prices are unchanged and the volume of inquiry and business remains about stationary. No. 2 foundry, Birmingham, is quoted by all makers at $11.50 for the remainder of the year and $12.50 for the first quarter of 1916. It is generally believed that buyers have covered pretty well for the remainder of the year and that business from now on will be 1916 orders almost exclusively.

## Ore Buying

### Is Not Active—Efforts Concentrated on Making Shipments

Cleveland, Sept. 14.—Iron ore agencies are not making much effort to sell at present, as they are pretty well sold up and do not wish to encourage buying at present prices beyond the requirements of furnaces after June 1, 1916. Several sales of fair size have, however, been made. Efforts are now being concentrated on making shipments of ore sold and all indications point to a movement of more than 8,000,000 tons this month.

### Advance is Expected

Philadelphia, Sept. 14. — Reports have reached the east that in view of the improved iron market, an advance of 50 cents in Lake Superior ores for the 1916 season probably will be quoted. According to these reports, the opening of books of ore sellers for next year's business may be at a comparatively early date. Some further buying of Superior ores to be brought down this season has been done by eastern Pennsylvania furnaces. A central Pennsylvania merchant furnace took 20,000 tons of Charlotte, a silicous Marquette ore at about 7 cents per unit, delivered, and the recently reported purchase of 60,000 tons by an eastern steel company was of the same mineral. Another eastern Pennsylvania steel company either has closed or has in final negotiations the contract for a large block of old range ores. Eastern domestic ores continue to be held at slightly higher prices. There are no developments in the foreign ore situation and this mineral remains a practically non-competitive factor.

## Coke Contract

### Calls for 150,000 Tons Annually for Five Years, Ironton Delivery

Cincinnati, Sept. 14.—The Kentucky Solvay Coke Co., Ashland, Ky., has sold to the Marting Iron & Steel Co., Ironton, O., furnace coke requirements of 150,000 tons annually for five years. This sale, which is one of the largest made in the history of the pig iron market in this territory, is on a sliding scale basis, and was brought about by Eaton, Rhodes & Co., Cincinnati, sales agents for the Kentucky Solvay Coke Co. Outside of this, the market is quiet for both furnace and foundry grades. Several southern Ohio stacks are being repaired and will very likely be blown in soon, in which case coke requirements will be needed. No changes in prices are reported from the Pocahontas, New River or Wise County districts, but they are firm and strong.

### Dull at St. Louis

St. Louis, Sept. 13.—Coke is dull. The inquiry is confined to small lots for immediate shipment, but prices are firm at $2.75 for standard Connellsville foundry grades.

### Higher, But Still Quiet

Pittsburgh, Sept. 14. — Connellsville coke makers have advanced prices of furnace coke for spot delivery to a minimum of $1.70, ovens. Contract fuel is being held at a spread from $1.90 to $2. It is understood a Uniontown seller has closed a sliding scale contract with a northern Ohio blast furnace interest for a stack which will not be blown in until pig iron prices advance further. Several tentative negotiations have been opened, but no important contracts have been closed recently.

Foundry fuel continues to gain ground. Spot cupola coke is commanding from $2.30 to $2.70, ovens, and contract coke is being held at $2.60, ovens, and above by most sellers. The *Connellsville Courier* for the week ending Sept. 4, says production was 379,935 tons, a decrease of 2,671, compared with the week before.

(*For complete prices see page* 552.)

## Flat Wire

### In Active Demand and Deliveries Are Much Delayed

Cleveland, Sept. 14. — The American Steel & Wire Co. reports no diminution in the demand for wire products, but some independents do not find the demand so active. The company is far behind on its deliveries of flat wire, for which there has been a very strong demand. There is a scarcity of wire rods.

### Nails Show More Snap

Pittsburgh, Sept. 14.—Specifications for nails from domestic consumers are coming out in heavier volume. This product is being held on the basis of $1.65 a keg. Plain wire, which continues active, is selling at $1.50 per 100 pounds. Galvanized wire is commanding $2.20, the extra for galvanizing being 70 cents per 100 pounds. England, France, Russia and Italy are buying heavy tonnages of barbed wire, some of which is being painted green.

## Warehouse Prices

### Are Advanced in Several Cities—Demand is Very Active

Cleveland, Sept. 14.—During the past six months warehouse business has steadily improved and the business of one large concern for September promises to make a new high record. Recent quotations are being firmly adhered to.

### Warehouse Prices Advance

Chicago, Sept. 14. — Several advances have been made in warehouse prices during the past week. Bars are now at 1.80c, shapes and plates at 1.90c and No. 10 blue annealed sheets at 2.10c, an advance of $1 per ton in each case.

Prices at St. Louis and St. Paul warehouses have been increased accordingly.

General demand for steel from store is increasing and the fall promises to be the best portion of the year.

Milliken Bros., Inc., steel fabricators, announce the removal of their executive and general offices from the Whitehall building, New York City, to the plant on Staten Island. The New York sales office also has been removed from the Whitehall building to 111 Broadway.

# Steel Bars for Munitions

## Are Still Called for in Very Large Tonnages and Some Additional Contracts Have Been Made

New York, Sept. 14.—The market continues to be flooded with large inquiries for steel rounds for shell manufacture. Sellers in this territory estimate that they now have before them inquiries aggregating 150,000 to 175,000 tons, a great part of which is for domestic companies manufacturing ammunition. In addition, there are large lots for foreign buyers before the mills, including the French requirements of 200,000 to 300,000 tons for first half. The Algoma Steel Corporation is understood to have taken 40,000 tons of rounds for export through J. P. Morgan & Co., probably for Great Britain, which is credited with open requirements at this time of about 100,000 tons. In view of the continuing heavy demand, makers are more independent in naming prices and those under 3.00c, mill, are less numerous. Some business in the week went at 2.85c, mill, but, on the other hand, orders also were placed as high as 3.50c, mill. Other bar descriptions besides rounds are in good demand on contract from domestic buyers. Certain makers of steel bars now are taking business at 1.40c, Pittsburgh, base, for first quarter or beyond.

### Heavy Bar Demand Continues

Philadelphia, Sept. 13.—The demand for shell rounds keeps up unceasingly and some further important orders have been closed by manufacturers in eastern Pennsylvania and New Jersey. A frog and switch manufacturer who recently inquired for 12,000 to 14,500 tons of large rounds and blooms for high explosive shells has closed. An eastern Pennsylvania engineering company placed 4,000 tons of 3 7/16-inch rounds. A New Jersey manufacturer of mining machinery bought 2,500 tons of rounds for this year from a western Pennsylvania steel company at a reported high price. An eastern Pennsylvania mill took 6,000 tons in the week from another buyer. Numerous other lots are in the market both for this year and next. One eastern maker still has about 15,000 tons of rounds to offer for this year. The Bethlehem Steel Co. is inquiring for 3,500 tons of cold-rolled rounds and for about 1,500 tons of other bars and billets. Prices on large rounds for shell making hold at about recent levels, but the lower figures gradually are moving up as the demand continues. Some business in the week went at 2.85c, mill, and one lot is reported to have brought 3.50c, mill. About 3c, mill, appears to be the average quotation. Specifications from the regular bar trade continue active. Some makers now have practically no free deliveries for this year, as they are quoting shipments 12 to 15 weeks. Some buyers have asked prices for next year and certain mills are understood to have quoted 1.40c, Pittsburgh. There are cases where buyers have offered this figure. The navy department is out for 2,500 tons of bars for its various yards to be bid upon Sept. 21.

### Bars Selling at 1.40c

Pittsburgh, Sept. 14. — Important steel bar buyers are opening negotiations for requirements the first and second quarters of next year, but manufacturers are not disposed to quote at the prevailing 1.35c figure. Some tonnage for nearby shipment has been sold at 1.40c in this district, and it generally is believed that consumers will pay that price for delivery after Dec. 31. Demand for large rounds for the manufacture of shells dominates the trade. Despite inability of mills to meet specifications for quick shipment, representatives of the entente nations are buying for shipment at the convenience of the mills. At the bi-monthly examination of sales sheets of representative bar iron mills in the central west, conducted by representatives of the Amalgamated Association and manufacturers at Youngstown yesterday, a 1.15c bar iron card was developed, which entitles puddlers to a rate of $5.80 a ton during September and October, or 10 cents above the rate prevailing in July and August. Pittsburgh mills are quoting bar iron at 1.40c, or 5 cents a ton above the previously prevailing minimum price.

### Steel Bars Firm

Chicago, Sept. 14.—No firmer situation exists in any department of the iron and steel market than in steel bars. Not only are mills well filled with orders for the remainder of this year and deliveries deferred more than usual, but large tonnages have to be turned down, as the capacity of mills is not sufficient to care for as much as is being offered. Buyers who expect to obtain anything like prompt delivery are doomed to continual disappointment and cannot obtain their requirements at any price except by waiting several weeks.

*(For complete prices see page 552.)*

No change has been made in the price of steel bars, which continue to be quoted at 1.54c, Chicago mill. Every effort is being made by mills to increase the tonnage of bars and mills ordinarily employed in rolling other forms are being fitted for producing bars to care for the excess tonnage demanded.

While little is being said regarding shrapnel rounds, it may be stated that large tonnages of this product are being offered and it is practically impossible to place an order at the present time. This steel is being quoted at 3.00c, Pittsburgh.

### Bar Iron Advances $2

Chicago, Sept. 14.—Following the decided advance in scrap which has taken place since 1.25c, Chicago mill, was established as the price of bar iron, this commodity was advanced late last week to 1.35c, Chicago mill, an increase of $2 per ton. Demand for bar iron has been increasing steadily and rolling schedules of all makers have been quickened while the usually busy month of October promises to bring in more tonnage than usual. This advance is considered entirely justified by conditions and has been foreshadowed for several weeks.

### Steel for Shells

Cleveland, Sept. 14.—The Hydraulic Pressed Steel Co. has closed for about 16,500 tons of rounds for the manufacture of 2,500,000 shrapnel shells. The company has not yet taken the contract for the additional 2,500,000 shells mentioned last week. It is understood that several companies outside of Cleveland are acting in harmony in bidding on about 2,500,000 rifles, which will call for a considerable tonnage of high grade steel.

### Iron for Export

Philadelphia, Sept. 14. — Eastern Pennsylvania makers of bar iron have been booking some good-sized orders for export recently. One mill took 1,500 tons of this class of business and another a smaller amount. The eastern bar iron market remains strong as the demand is active. Some makers now are asking 1.35c, Pittsburgh, or 1.509c, Philadelphia, on ordinary lots. The present market appears to range at from 1.30c to 1.35c, Pittsburgh.

### Hoops, Bands, Shafting

Pittsburgh, Sept. 14.—Manufacturers of cold-rolled steel shafting have enough tonnage on their books to keep plants operating at maximum capacity three or four months. It is not improbable that prices will advance at least $1 a ton in the near future. Specifications for hoops and

bands, held at 1.35c and 1.40c, respectively, show considerable snap. Some makers expect to advance the price of hoops at an early date.

**Inquiry for Rounds**

Buffalo, Sept. 14. — The demand keeps up. There is an inquiry from Erie for 36,000 tons 9-inch x 30-inch forged rounds, 4 to 5 per cent nickel steel, but mills and agencies here are not disposed to consider it owing to early delivery requirements involved.

# Government Needs Plates

## For Different Navy Yards—5,000 Tons for New York Subways is Before Eastern Mills

Philadelphia, Sept. 13.—Bids will be taken Sept. 21 by the bureau of construction and repair of the government on about 11,000 tons of various quality plates for the different navy yards. The largest single item is 8,200 tons of medium steel, 10 to 70 pounds inclusive. One important eastern producer of plates now is quoting a minimum of 1.40c, Pittsburgh, or 1.559c, Philadelphia, for current delivery, and has booked a number of orders at this figure, including one of slightly less than 1,000 tons. The deliveries this mill is promising run six to eight weeks. Other eastern plate makers are not so strong in their position and still will accept 1.35c, Pittsburgh, which seems to be minimum. One of these makers, however, has quoted and obtained fourth quarter contracts at 1.45c, Pittsburgh, or 1.609c, Philadelphia. Railroads have been ordering better for car and locomotive work in their own shops, and specifications from outside builders also are larger. A new requirement of 5,000 tons for New York subways is before eastern plate makers.

**Plates Reflect Improvement**

Pittsburgh, Sept. 14.—Specifications for steel plates have been coming out in somewhat improved volume and prices are firmer. Mill managers say they experience less difficulty in obtaining 1.35c than a fortnight ago. Car builders are not taking normal requirements, but fabricating shops are specifying briskly.

**Fairly Firm**

Cleveland, Sept. 14.—The plate market is not as strong as it was expected a month ago it would be by this time and some difficulty is being experienced in maintaining the 1.35c quotation. It has been obtained on some tonnages, and even higher has been paid on boiler steel.

**Plates Still Weak**

Chicago, Sept. 14.—Steel plates continue to lag somewhat, although demand is increasing materially. Some large oil tank work for the Santa Fe Railroad was placed in this market recently and other business has made a fair showing. Smaller makers of plates are shading the market and they may be obtained at a concession of $1 from the prevailing quotation of 1.54c, Chicago.

# Ferro Sales

## For Spot Shipment at $115—Uncertainty Still Prevails

New York, Sept. 14.—Some eastern users of ferro-manganese in the week have closed for carloads for spot shipment at $115, seaboard, and smaller lots at $125, seaboard. The situation has developed no new points of interest and the uncertainty regarding the restoration of shipments by English makers in this country, remains undispelled. One English maker, to whom a September license recently was granted to ship to its customers here a fair tonnage, is getting its boat away this week. This lot, which probably will be about 1,500 tons, will arrive early in October. This maker has been accepting some further business from its regular customers for shipment this year at $100, seaboard, on which delivery is specified to be made by a certain time. It also is offering to accept first half business at $100, seaboard, but no contracts of this kind have been closed. A scattered inquiry of fair tonnage is out. A curious feature of this is that it includes a lot of 500 tons for shipment to England. This would indicate that some of the English consumers are short of metal also, though more likely this lot is for re-export. Both the two domestic makers of spiegeleisen are holding for $28 for 20 per cent.

The manganese ore market continues to show some activity, in view of the higher prices being offered by consumers. Another cargo of Brazilian ore was sold to an eastern steelmaker within the week at 43 cents per unit at tidewater. There has been a considerable buying of domestic manganese ore from the Cartersville, Ga., district. An eastern steel company, as reported recently, bought several carloads of this ore at 38 cents per unit, delivered, and a southern furnace has bought 1,500 tons. Another domestic maker of ferro-manganese now has cleaned up the ore on hand at these mines at a reported price of about 40 cents per unit, delivered. The Cartersville ore runs about 40 to 45 per cent in manganese content. There are indications in other directions that the recent sharp advance in the price of domestic ores is stimulating the searching out of deposits in various states.

**Ferro Manganese Offered at $100**

Pittsburgh, Sept. 14.—Despite the advancing market tendency in the east, at least one seller of English ferro-manganese in this district is offering material at $100, eastern seaboard, and a 100-ton lot was purchased at that figure a few days ago. Demand for ferro-alloys and steelmaking metals continues decidedly heavy and it is extremely difficult to obtain some of the metals necessary for the manufacture of high speed tool steel. Prices are as follows:

Ferro-manganese, prompt, $100 to $105 a ton at the eastern seaboard.

Spiegeleisen, $26 to $28 a ton, at the furnace.

Ferro-silicon, 50 per cent, $75 a ton for carloads and $73 a ton for more than carloads, at Pittsburgh.

Bessemer ferro-silicon, 9 per cent to 10 per cent, $19; 10 to 11 per cent, $20; 11 to 12 per cent, $21; 12 to 13 per cent, $22 a ton at the furnace at Ashland, Jackson and New Straitsville, O.

Ferro-chrome, 4 to 6 per cent carbon, 20 cents per pound; 2 per cent carbon, 40 cents per pound, delivered.

Ferro-vanadium, $2.25 to $2.30 per pound of contained alloy, Pittsburgh.

Ferro-carbon titanium, 8 to 12½ cents per pound in carloads.

Nickel, 50 to 55 cents per pound.

Ferro-tungsten, nominal, at $3 to $3.50 per pound of contained alloy.

Cobalt metal, $1.60 to $1.75 per pound, Pittsburgh.

Aluminum, 55 cents per pound, New York.

Ferro-molybdenum, Pittsburgh, nominal.

# Bolts and Nuts

Pittsburgh, Sept. 14.—The advance of 5 per cent on small bolts announced by *The Iron Trade Review* last week, is being adhered to. Large bolts, screws and nuts were not affected. Structural rivets are firm at 1.60c, Pittsburgh, and some makers are asking 1.65c. Specifications from domestic consumers show considerable snap and a fairly large volume of foreign business is enjoyed. Russia has been one of the principal foreign factors in the American market the last 60 days.

*(For complete prices see page 552.)*

# Steel Lettings

**Made a Good Showing in August—Deliveries Are Satisfactory**

New York, Sept. 14.—Another good month for structural steel lettings was represented by August, when the total awards in the country amounted to 85 per cent of the full capacity of the bridge and structural works or approximately 146,000 tons, according to the announcement of the Bridge Builders' and Structural Society. The August bookings were only slightly less than July, when the orders were 86 per cent of total capacity or approximately 148,000 tons. The August showing was better than had been expected, since it was believed the tonnage would fall short of July by a larger margin. Reports of structural shop conditions in the country show that the most active districts at present are in the east and in the middle west. In the south and southwest the situation remains backward.

The statistics of structural awards, as compiled monthly by the Bridge Builders' and Structural Society, are as follows:

| Month. | Per cent. | Approx. tonnage. |
|---|---|---|
| August, 1915 | 85 | 146,000 |
| July | 86 | 148,000 |
| June | 80 | 138,000 |
| May | 61 | 105,000 |
| April | 62½ | 107,500 |
| March | 64 | 110,000 |
| February | 30 | 51,000 |
| January | 25 | 43,000 |
| December, 1914 | 35 | 60,000 |
| November | 20 | 35,000 |
| October | 35 | 60,000 |
| September | 38½ | 65,000 |
| August | 27½ | 48,000 |
| July | 68 | 115,000 |
| June | 56½ | 95,000 |
| May | 57 | 97,000 |
| April | 88 | 151,000 |
| March | 76 | 130,000 |

New tonnage offered for bids in eastern territory is of lighter volume, and awards also are moderate. Some fair apartment house awards are being made. The Interborough Rapid Transit Co. has up for consideration the extension of the Third avenue elevated line to White Plains avenue, Manhattan, which will require 8,000 to 9,000 tons. This work may be done this fall. Fabricating prices continue to improve slowly, but the situation is spotty. The mills report no shortening of deliveries, as specifications are heavy. Some makers now give their shipments as six to eight weeks. Plain material prices are firm and gradually are getting stronger. For current business, 1.40c, Pittsburgh, or 1.569c, New York, is being obtained in numerous cases by eastern mills and 1.45c, Pittsburgh, now is talked of. On first quarter contracts, some makers will quote 1.40c, Pittsburgh.

### Progressing Towards 1.40c

Philadelphia, Sept. 13.—A movement towards 1.40c, Pittsburgh, or 1.509c, Philadelphia, minimum, on shapes is making progress among eastern makers. So far extended are the order books of these mills at the present activity of specifications that they have only moderate tonnages unsold for the rest of the year. For that reason, they are opposing the acceptance of contracts and are endeavoring to confine new business to current orders which can be fitted into mill schedules. Some sizes are obtainable in six to eight weeks, but a complete specification could not be shipped under ten weeks or more. Where circumstances have made it necessary that certain buyers be allowed to contract for fourth quarter, this has been done at 1.40c, Pittsburgh, and then the tonnage desired has been scaled down greatly. The minimum to the very largest buyer is 1.35c, Pittsburgh. On new odd lots for current delivery, the usual price is 1.40c, Pittsburgh, with some mills quoting 1.45c, Pittsburgh. After Sept. 15 one mill has adopted 1.45c, Pittsburgh, as minimum for this class of orders. Fabricating prices are strengthening, as some of the largest shops in this territory now are taking work only for shipment after Jan. 1. Bids go in Oct. 19 on the Frankfort elevated railway extensions here which will require about 25,000 tons. Plans are in the final stage. The bureau of construction and repair of the navy department will take bids Sept. 21 on 3,200 tons of assorted shapes for navy yard consumption.

### Shapes Firm at 1.35c

Pittsburgh, Sept. 14. — Structural shapes are decidedly firm at 1.35c in the Greater Pittsburgh district. Small tonnages for prompt delivery are being sold at 1.40c. Consumers show considerable interest in the market for first and second quarter delivery; they probably will pay 1.40c for plates, shapes and bars for delivery after Jan. 1. Fabricating shops are operating at about maximum capacity, but most of them will need additional tonnage before the end of this quarter. No important structural contracts have been placed this week.

### Fabricators Busy

Buffalo, Sept. 14.—The appearance of construction work requiring scattered tonnages representing a good aggregate as well as a number of jobs taking considerable tonnage in each case, has increased the activity of the fabricating plants in this territory. Some of the interests are filled up until November. Fabricating prices are not only firmer but higher than prevailed earlier in the season. Quick deliveries are being demanded.

*(For complete prices see page 552.)*

### Hollenden Addition

Cleveland, Sept. 14.—Very few projects are pending in Cleveland, at present, the principal ones being 1,000 tons for an addition to the Hollenden hotel, for which the general contract has been awarded to J. L. Stuart, and 400 tons for Union street grade elimination work, on which bids are to be received Thursday by the city.

### Shapes are Steady

Chicago, Sept. 14. — Business in the structural steel market is steady and firm. Although no large projects are being inquired for in the west, there is a multitude of small tonnages and new business aggregates a pleasing total. Structural shapes are obtainable at 1.54c, Chicago mill, without tendency to shading.

During the past few days a contract has been awarded to Hansell-Elcock, Chicago, for a building for the International Tailoring Co. in this city, involving 1,225 tons. Another comparative large tonnage is for oil storage tanks for the Santa Fe railroad, requiring 1,000 tons of plates, which is taken by the Kennicott Co. Other lettings are for comparatively small tonnages.

### Issue More Permits

A gain of approximately 65 per cent in new construction in the city of Milwaukee is reported by the building inspector for August, 1915. In August, 1914, there were issued 304 permits valued at $673,729, while last month the issue was 327 permits, with a value of $1,073,079. August is the only month but one that shows a gain this year, April having been better than the corresponding month a year ago.

### CONTRACTS AWARDED.

Boiler house, New Haven, Conn., Westinghouse, Church Kerr Co., general contract, 300 tons to Lackawanna Bridge Co., Buffalo.

Archer-Daniels Linseed Co., Minneapolis, new plant at Buffalo, Monarch Engineering Co., Buffalo, general contract, 600 tons structural for mill to Ferguson Steel & Iron Co., Buffalo; 100 tons reinforcing bars, foundations and bins, to Buffalo Structural Steel Co., Buffalo.

Curtiss Aeroplane Co., Buffalo, four story addition; 80 x 300 feet, 750 tons structural, to Ferguson Steel & Iron Co., general contract to John W. Cowper Co., Buffalo.

Ferguson Steel & Iron Co., Buffalo, contract for 500 tons fabricated steel, to be shipped to Johannesburg, South Africa, for mining buildings.

Our Lady of Victory Church's Infant Home, Buffalo, 300 tons, to Progressive Steel Co., Buffalo.

Atlas Steel Casting Co., Buffalo, plant addition, 100 tons, to Progressive Steel Co.

Orchard Park, N. Y., new high school, 100 tons, to Progressive Steel Co.

Court house, Westchester county, White

Plains, New York, 750 tons, general contract placed with John C. Brady & Co., of New York.

Columbus Hospital, Buffalo, addition, 100 tons, to Progressive Steel Co.

Addition to pattern storage department of the Bethlehem Steel Co., South Bethlehem, Pa., 600 to 700 tons, to the Hay Foundry & Iron Works.

Mordecai apartment, Fifty-third street and Park avenue, New York City, 1,800 tons, to the Hinkle Iron Works.

Loft building, Fifty-ninth street and Fifth avenue, New York City, 400 tons, to the W. B. Shafer Co.

Subway connection at Lexington avenue, Forty-second and Forty-third streets, New York City, for the New York Central railroad, 1,500 tons, awarded to the Phoenix Iron Works.

Eleven small bridges for the New York Central railroad, 200 tons, divided between L. F. Shoemaker & Co., and the Fort Pitt Bridge Works.

Mill building for the American Trona Corporation, Searels, Cal., 400 tons, to the McClintic-Marshall Co.

Three buildings for the Tacoma Smelting Co., Tacoma, Wash., 700 tons, to the Kansas City Structural Co.

Addition to the Winchester Repeating Arms Co., New Haven, Conn., 300 tons, to an independent shop.

Twenty-ninth street pier, Brooklyn, 600 tons, to the American Bridge Co., by the McHarg-Barton Co., the general contractor.

Apartment house for Paterno Bros., Eighty-ninth street and West End avenue, New York City, 700 tons, to the American Bridge Co.

International Tailoring Co., building, Chicago, 1,225 tons, to Hansell-Elcock.

Atchison, Topeka & Santa Fe Ry. Co., four oil storage tanks, 1,000 tons, to Kennicott Co.

Overland Stores Co. additional material for building at St. Paul, Minn., 838 tons, to American Bridge Co.

Los Angeles county, Cal., eleven 80-foot through plate girders, 630 tons, to American Bridge Co.

Viaduct for the Western Pacific Ry., Quincy Junction, Cal., 630 tons, to American Bridge Co.

Highway bridge for Hemphill county, Tex., 468 tons, to Canton Bridge Co.

Bascule bridge for City of Green Bay, Wis., 249 tons, to Worden-Allen.

### CONTRACTS PENDING.

Apartment houses at West End avenue and 103rd street and Riverside drive and 108th street, New York City, for Paterno Bros., 1,200 tons, bids being taken.

Apartment house for Bing & Bing, Eighty-second street and Lexington avenue, New York City, 900 tons, bids being taken.

Extensions of the Frankfort elevated line, Philadelphia, about 25,000 tons, bids to be taken Oct. 19; plans being issued.

Extensions to the plant of the Carpenter Steel Co., Reading, Pa., 1,150 tons, bids being taken.

Substructure for Thirtieth street pier, Brooklyn, 1,000 tons, bids being taken.

Buildings for the Consumers Biscuit Co., Brooklyn, 450 tons, bids being taken.

Hollenden hotel addition, Cleveland, 1,100 tons, J. L. Stuart, general contractor.

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The American Optical Co., Southbridge, Mass., the largest of its kind in the world, is to present the Columbia University school of optometry in New York with about $1,500 worth of machinery, which represents a complete optical workshop.

# Billets and Blooms

**Offered by Algoma Steel Co. Not Readily Sold—Active Foreign Demand**

Pittsburgh, Sept. 14.—Prices of semi-finished steel products, including billets, sheet bars, forging billets and wire rods, continue to advance, but it is difficult to offer definite quotations, because of the absence of sales in the open market. Some contracts for fourth quarter delivery are being considered and it is understood more important consumers will be able to obtain open hearth billets and sheet bars at about $25 to $26, respectively, at Pittsburgh. Slight irregularity has featured the billet and sheet bar market at Youngstown the last 10 days, but most mills in the Youngstown district are quoting prevailing maximum prices. Forging billets are being held at $35, Pittsburgh, and wire rods, which are scarce, are commanding as high as $29 and $30, Pittsburgh. The market for muck bar is nominally quoted at from $27 to $28. The extreme heat of the last few days has curtailed the output of rolling and finishing mills to a considerable extent, causing shipments to be even more deferred.

### Large Eastern Tonnages Offered

Philadelphia, Sept. 13. — Two large lots of billets, 20,000 to 25,000 tons each, either rerolling or forging, and both for eastern Pennsylvania car builders have been placed before the mills here. These inquiries apparently are for munition purposes, as British specifications are attached and they may be a duplication of the requirements of a pending shell contract. Makers have not been disposed to quote because of the requirement that the billets be sawed and broken by the mills and this clause may be waived. by the buyers. Another lot of 3,000 tons of forging blooms has been taken by an eastern Pennsylvania maker for shipment to France at full domestic prices. Italy has inquired here for 10,000 tons of 19 and 21-inch ingots for shipment over the next four months. Foreign orders usually are not so sought by makers at present. The government asks 850 tons of forging billets for various navy yards for bids Sept. 21. A good demand for semi-fiinished steel both for domestic and export buyers, is coming before eastern makers regularly. Eastern Pennsylvania mills continue very strong in their schedules, holding rerolling billets at $30 to $32, Philadelphia, and forging billets at $36 to $38, Philadelphia, depending on quality. A lot of 500 tons of very ordinary rolling steel was taken for western shipment at $28, mill. Offers of billets and bloom in this territory by the Algoma Steel Corporation have not attracted much business. The prices which the buyers have offered have not been attractive because of the high freight.

*(For complete prices see page 552.)*

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# Cast Iron Pipe

**Shows Moderate Improvement in Western Territory**

Chicago, Sept. 14. — A slight increase in demand for cast iron pipe has appeared in the west and some fair tonnages have been placed recently.

The Glamorgan Pipe & Foundry Co. has been awarded 2,000 tons for the city of Chicago; the United States Cast Iron Pipe & Foundry Co. has taken 750 tons at Christopher, Ill.; the Colorado Fuel & Iron Co. has been awarded 400 tons at Craig, Colo., and a local concern has taken 100 tons at Decatur, Ill.

Bids will be opened at Macon, Mo., Sept. 14 on 500 tons, at Kansas City, Mo., Sept. 15 for 1,000 tons and at Carlton, Minn., the same day on 200 tons.

### Active Inquiry for Export

New York, Sept. 14.—Export inquiries are becoming more interesting to eastern and southern cast iron pipe makers. Requirements estimated at about 10,000 tons are in the market or in prospect for South America, including a new definite inquiry for 1,200 to 1,500 of 24-inch and flexible joint pipe for Port Alegro, Brazil. Plans are being prepared for a waterworks improvement at San Juan, Porto Rico, which, it is estimated, will require about 10,000 tons of 24-inch. Bids are expected to be asked in several months. For Panama delivery, 525 tons of 4's to 14's will be bid upon Sept. 24. Domestic business is fair, but not heavy. Public lettings are light. The situation in the metropolitan district, especially, is quiet. On a contractor's letting for Watervliet, N. Y., R. D. Wood & Co. have secured 5,000 tons of 20's and 1,000 tons of 16's and 18's. The Warren Foundry & Machine Co. and the United States Cast Iron Pipe & Foundry Co. recently divided 2,200 tons of 6's to 14's for the same city. On a Philadelphia letting of 2,100 tons, the Donaldson Iron Works secured the 3's at $32.34, delivered; the 4's at $27.54, the 6's at $24.04, and the 10's at $23.54. The Standard Cast Iron Pipe & Foundry Co. was awarded the 8's at $23.80. The United States Cast Iron Pipe & Foundry Co. has taken from the contractor 780 tons of 4's to 16's for Wellsville, N. Y.; Manchester, N. Y., is taking bids this week on 375 tons of 4's to 10's, and Edgewater, N. J., is re-advertising 570 tons of 72's.

# Scrap Market

**Is Not Active—Tendency to Softness in Some Centers**

New York, Sept. 14.—Quieter conditions have developed in the old material market and some grades seem a little softer, but there is no evidence of genuine weakness. A number of the buyers, having satisfied their requirements by their recent activity in the market, are not doing much for the moment and are offering lower in some cases. Heavy steel seems firm at $15, delivered, eastern Pennsylvania, or $12.25, to $12.75, New York. Certain grades have added to their strength. This is true in heavy cast, where, in conformity with the higher pig iron market, New Jersey buyers are paying about 25 cents more. Material still comes out rather slowely.

**Advance Arrested**

Philadelphia, Sept. 13.—A pause has been reached in the steady upward movement of prices in the eastern Pennsylvania scrap market. Important consumers, having filled their requirements through recent large-scale buying, now have withdrawn from the market and have dropped their offers. However, there is no sign of weakness anywhere and some large buyers still are in the market. This is true in heavy milling steel where present offers, after liberal sales at this figure, remain at $15, delivered. Fair sales of No. 1 railroad wrought were made the past week at $16.50, delivered, and brokers who offered this figure on the monthly railroad lists obtained no awards. The two leading buyers of wrought pipe have dropped their offerings to $14 to $14.50, delivered. Old car wheels here sold in some cases at $14.50, delivered, eastern Pennsylvania.

**Advances Sharply**

Pittsburgh, Sept. 14.—All grades of scrap have advanced in price this week. Several large lots of heavy melting steel have been sold at $15 and most dealers are refusing to shade that figure. Low phosphorus scrap has commanded as high as $20 a ton. Bundled sheet scrap has advanced 50 cents a ton and No. 1 busheling, cast borings and cast scrap have advanced 25 cents a ton.

**Buffalo Market Active**

Buffalo, Sept. 14.—While dealers in the Buffalo district report an active market, with advances of 50c per ton in the schedules for bundled sheet scrap, Nos. 1 and 2 busheling scrap, the feeling prevails that railroad buying of supplies and accessories will have to come into the field in order to give it a healthier tone. The bulk of the activity, it is figured, is due war order business and as long as this artificial element prevails, the dealers are inclined to view the market with a degree of uncertainty. A number of dealers, in fact, are making the market in a number of lines by covering short orders, paying really more than the mills are ready to give in order to cover themselves.

**Buying Not Active**

Cleveland, Sept. 15.—Business in the scrap market is extremely quiet. Quotations are unchanged, although the price situation is a little uncertain and the trade appears slightly apprehensive. Fewer complaints are heard of mill rejections and holding up of shipments, although a large quantity of scrap is moving on old orders. New buying is not active at present, most consumers being well covered for the near future.

**Stronger at Chicago**

Chicago, Sept. 14.—Scrap iron and steel are marking time. No transactions of any consequence have taken place for some time and quotations are based largely on deals between brokers to fill their orders and on prices in other centers to which considerable heavy melting steel is being shipped from this territory. Heavy melting steel is quoted at $12 to $12.50 per gross ton, but sentiment is general that should consumers come into the market for further supplies, they would be unable to obtain it at this figure. Other grades are affected by the situation in heavy melting steel, as rolling mill grades are somewhat stronger in view of larger demand for bar iron.

This is the off season for railroad scrap and not much is being offered. The Union Pacific railroad has issued a list containing 1,650 tons and the Soo Line offers 1,420 tons.

**Tendency Toward Weakness**

St. Louis, Sept. 13.—Very little trading in iron and steel scrap was reported in this market last week, the mills having large tonnages on hand and taking on additional scrap only at bargain prices. While quotations have not receded, the tendency is toward a weaker market. The only offering this week is a list of 1,750 tons from the Union Pacific railroad, very little of which, however, will move in this market.

**Better Feeling**

Cincinnati, Sept. 14.—The scrap market is stationary. A slight weakness was apparent last week, due to the sudden dropping off of sales, but a better feeling is evident today. Rolling mills bought heavily in August, and now have sufficient quantities on contracts to run them through the year. Jobbing foundries are buying sparingly from hand to mouth, and stove foundries are melting far below normal. Heavy melting and No. 1 machine cast are the best sellers in the market, the former being quoted at from $10.50 to $11 per gross ton, and the latter at from $9 to $9.50 per net ton, both dealers' yards.

*(For complete prices see page 552.)*

# Sheet Prices

**Show a Hardening Tendency—Uncertainty as to Galvanized**

Pittsburgh, Sept. 14.—With consumers manifesting interest in the market for fourth quarter delivery, steel sheet manufacturers are quoting maximum prices in most instances. Open hearth steel sheets are selling at $1 and $2 a ton above quotations for bessemer steel products. Some makers are asking 1.60c for No. 10 blue annealed sheets and as high as 2c has been paid for No. 28 gage black sheets. Galvanized sheet products continue to be nominally quoted as the result of the uncertainty and irregularity of the spelter market. High prices of spelter have made idle approximately 50 per cent of the galvanizing capacity of the country, according to estimates of people in close touch with the situation.

**Pay High Prices in East**

Philadelphia, Sept. 13.—For early delivery of blue annealed, a leading eastern maker has booked a number of orders at 1.759c, Philadelphia, or 1.60c, Pittsburgh, for No. 10 gage, and now is naming this price generally. Buyers apparently are willing to pay a liberal premium above the accepted market figure on blue annealed sheets where the maker can furnish early shipments. Some of the other eastern producers are not quoting so high. Some inquiries for next year contracts have come from the eastern trade, including one for the first half, but mills in this territory are unwilling to obligate themselves so far ahead.

**Sheets are Higher**

Chicago, Sept 14. — Makers of steel sheets find their business increasing materially and No. 28 gage black is now quoted at 2.14c to 2.19c, Chicago mill, a sharp advance having been registered last week.

The leading independent maker of sheets still remains out of the galvanized sheet market and will not contract while

spelter remains above 11c. Ohio mills are offering galvanized sheets at 3.79c, Chicago, for No. 28 gage with the new scale of differentials applying for other gages.

### Not Disposed to Contract

Cleveland, Sept. 14. — No. 28 black sheets are being sold at 1.90c. This is regarded as a low price by the mills, which are not disposed to take on much tonnage at that figure. On No. 10 blue annealed, 1.50c, Pittsburgh, is the usual quotation.

### Stronger at Cincinnati

Cincinnati, Sept. 14.—The sheet market is a little stronger, and prices show a tendency to advance. Sales are light, but principally because mills are refusing to sell for forward delivery. The outlook is for much heavier buying after the first of the year. Black sheets No. 28 gage are given at from 1.90c to 2c, and galvanized sheets No. 28 gage at from 3.75c to 3.85c, both Pittsburgh basis.

### Tin Plate Prices for 1916 Discussed

Pittsburgh, Sept. 14.—Several large consumers of tin plate are showing interest in the market for next season, but it is not probable that prices will be named until the future situation appears more certain. The British embargo on tin which permits shipments to America only under restricted conditions, seems to have taken this metal out of the hands of speculators, but the ultimate effect of the embargo is yet to be determined. Manufacturers say much more remunerative tin plate prices will be enjoyed next year. Specifications are coming out in good volume and a number of large contracts for shipment to far eastern countries have been placed.

## Large Pipe Order

**Will be Placed by East Ohio Gas Co.—Line Pipe for Texas**

Pittsburgh, Sept. 15.—The East Ohio Gas Co. has completed plans for a gas line to extend between Canton and Youngstown, O. Fifty miles of 14-inch pipe, involving about 7,000 tons, will be purchased, probably at Youngstown. An attractive order of line pipe, details of which are not announced, has been placed for Texas shipment. Further advances in the price of crude oil are expected to stimulate activity in the oil country fields. Generally, the market for tubular goods is quiet. Manufacturers of seamless tubing are driving mills at capacity; shipments of seamless tube products are deferred four or five months in some instances.

## Rail Requirements

**Are Being Placed—More Life in Equipment Market**

New York, Sept. 14.—Leading eastern trunk lines which have been making preliminary arrangements to buy part or all of their next year's rail requirements at early date already are taking action. It is interesting to note that some of these roads are placing orders against their 1916 budgets, but are asking for deliveries on some tonnage for this fall. The mills have made arrangements in some cases to accommodate fixed tonnages for rolling before Jan. 1. One eastern line bought in this way, 10,000 tons from two or three makers which is to be rolled at an early date. The New York Central lines are figuring on rails, partially for delivery this year and practically has placed some lots. The Southern railway has placed 5,000 tons for this year with the Pennsylvania Steel Co. and the Lackawanna Steel Co. has received about 10,000 tons additional from the Russian government railways increasing its total order for rails and track supplies for that country to more than 100,000 tons.

The equipment market is becoming more active. The Illinois Central railroad is in the market for 1,000 automobile and 1,000 box cars. The Wheeling & Lake Erie is asking 650 gondolas and 200 automobile cars. Other scattered inquiries and orders represent a larger total.

Locomotive orders of the week were the largest in some time, totaling about 60. The Chicago & North-Western bought 45 from the American Locomotive Co. and the Chicago, St. Paul, Minneapolis & Omaha 10 from the same builder. The Texas & Pacific ordered 13 from the Baldwin Locomotive Works. The Illinois Central is inquiring for 50 Mallets and the Norfolk & Western for 30 of the same type.

### Light Rails Advance to Standard Base

Pittsburgh, Sept. 14.—The Carnegie Steel Co. and other light rail manufacturers last week advanced prices about $2 a ton and now are quoting open hearth and bessemer sections, weighing from 25 to 45 pounds, inclusive, at 1.25c, the prevailing price of standard bessemer sections. The schedule for light rails follows: 8 to 10 pounds, 1.40c; 12 to 14 pounds, 1.35c; 16 to 20 pounds, 1.30c; 25 to 45 pounds, 1.25c. The previously prevailing price of sections, weighing from 25 to 45 pounds, was 1.16½c per pound. Some makers have been asking 1.25c for several weeks. Domestic demand for light rails is described as fairly satisfactory. Demand has been augmented considerably by the call for portable railroads in France and Russia, used for transporting troops and military supplies. Much of the rail capacity of the country now is engaged in rolling large rounds for shells. Western railroad interests have been buying standard sections for next year's requirements and eastern railroad interests show a disposition to cover needs. Standard spikes are being held at 1.50c, and track bolts are commanding 2c.

### Much More Interest

Cleveland, Sept. 14.—Perhaps the most important development in the finished material market during the past week has been the increased activity of railroads which are showing much more interest in the market for various products. One of the largest systems is inquiring as to wheels. The Clover Leaf has placed 1,500 tons of rails with the Carnegie Steel Co. and 750 each with the Cambria and the Lackawanna Steel companies. The Wheeling & Lake Erie will order 850 cars, of which a part are 70-ton gondolas. The Erie railroad has placed from 28 to 33 locomotives, divided among the Lima, American and Baldwin locomotive works. The Norfolk & Western is in the market for 30 locomotives.

## Lead Price Cut

**Making a Reduction of $8 in Five Days—Spelter is Easier**

New York, Sept. 14. — When the American Smelting & Refining Co. today reduced its price on lead $4 a ton to 4.50c, New York, or 4.42½c, St. Louis, this action represented a total cut of $8 a ton in this metal in five days. On Sept. 9, a reduction of from 4.90c, New York, to 4.70c, New York, was made. This drop in the lead market, which has been the feature of the week in various metals, has been the outgrowth of the continued quietness of demand. No important buying has been stimulated by the lower prices and the view is expressed in the trade that there will be no renewal of export purchasing which is awaited, especially from England, until the market here is more in line with that abroad.

Tin has been in some demand during the week, but at no time was the buying active. Prices got up to about 33.75c, New York, due to the stronger position of foreign exchange but today are quoted lower at 33.25c, to 33.75½c, following a drop of one pound in the London market. The premium for spot tin has disappeared.

Buying of spelter has been confined

(*For complete prices see page* 552.)

chiefly to carload lots for spot delivery, for which the offered supply is quite limited. Prices have continued gradually to ease off and in prime western, spot metal has been offered at 13.50c, St. Louis. The range of the market is about 13.50c to 14c, St. Louis, on spot, 13c to 13.50c for October and 12.50c to 13c for November and December. Brass special is quiet at 16c to 16.50c, St. Louis.

Copper, after several days of moderate easiness, due to inactive buying, has developed more firmness during the past few days. An advance of two pounds in the London market today, has contributed toward a better sentiment. Some leading producers still are quoting electrolytic at 18c, delivered 30 days. Others have done 17.75c. Metal in second hands is available at 17.50c to 17.62½c. On the best grades of casting copper, 17.25c to 17.50c, delivered 30 days, is being done; and on the ordinary brands, 16.25c to 16.50c, cash, are quoted. The best brands of lake are 18c to 18.50c, cash, ordinary brands at 17.25c to 17.75c, cash, and arsenical at 17.50c to 17.62½c, cash.

## Very Short

### Is Final Decree in United States Steel Corporation Suit

The final decree under the recent decision of the United States district court of New Jersey in the government dissolution suit against the Steel Corporaton, as filed at Trenton, N. J., Sept. 10, is of a very brief character. Under the agreement of counsel, the decree simply orders a dismissal of the suit. The government now has 60 days from the date of the filing of the decree to appeal to the Supreme Court of the United States, the adverse finding of the district court. This means that its appeal must be filed by Dec. 10.

The final decree entered at Trenton is as follows:

In the District Court of the United States for the District of New Jersey. Between the United States of America, Petitioner, and United States Steel Corporation and Others, Defendants. Final Decree.

This cause came on for final hearing at this term, and was argued by counsel, and thereupon, upon consideration of the arguments, pleadings and proofs, it was ordered, adjudged and decreed as follows, viz.:

That the prayer of the petition of the United States of America be, and the same is hereby denied, and that the said petition be, and the same is hereby dismissed.

## Will Soon Appeal

Washington, Sept. 11.—Appeal by the government from the decision of the United District court of New Jersey which dismissed the dissolution suit against the United States Steel Corporation may be made as soon as the Supreme Court convenes in October. The appeal will at least be filed with the court within 60 days from last Friday, when the decree of the lower court was entered at Trenton, N. J. The law requires that action should be taken within that period. It was stated at the department of justice that at no time after the decision had been handed down was there any intention other than to appeal the suit. The appeal, it is thought, will be based upon a reiteration of claims made by the government in its brief.

## Mr. Jay Resigns

John C. Jay Jr., who has been vice president and general manager of sales of the Pennsylvania Steel Co., with headquarters in Philadelphia, has resigned, effective Oct. 1, to become

JOHN C. JAY

chairman of the board of the Maxwell Motor Co., Detroit, vice J. A. Vail, resigned. He also has been made a director of the company. Mr. Jay has had an especially successful career in the steel trade and for a young man has held an unusually large number of positions of important responsibility. His work has been particularly effective in administrative and executive capacities as well as in salesmanship, and his new post will afford him a wide latitude for the exercise of these qualities. After graduating from Williams College in 1901, he entered the employ of the Pennsylvania Steel Co. as an apprentice at Steelton, Pa. He became a salesman for the company at New York in 1902 and was made manager there in 1906. In June, 1912, he was appointed general manager of sales of the company, with headquarters at Philadelphia. He was made a vice president, a newly-created office, March 25, 1915. Mr. Jay is a native of New York and a direct descendent of John Jay, the first chief justice of the United States. He is 35 years of age.

*(For complete prices see page 552.)*

## Gillespie Succeeds Jay

New York, Sept. 15. (By wire.)—R. W. Gillespie, New York sales manager of the Pennsylvania Steel Co., has been made general manager of sales, vice John C. Jay, resigned. He has been connected with the company since his graduation from Wesleyan college in 1904.

## Youngstown Contracts Awarded

The Youngstown Sheet & Tube Co., Youngstown, O., announces the following contracts for its new merchant mills, power house and bridges, some of which have been published in *The Iron Trade Review*:

MERCHANT MILLS.

To the McClintic-Marshall Co. steel work of the buildings for the new 9-inch and 12-inch merchant mills. These buildings will have about 3,000 tons of steel. The roofs will be the Pond type.

To the Cleveland Crane & Engineering Co. three 15-ton, 96-foot span and three 15-ton, 86-foot span, E. O. T. cranes.

To the Westinghouse Electric & Mfg. Co. 15 alternating current motors; and to the Crocker-Wheeler Co. 30 direct current motors. Two 600 horsepower, direct current, and one 700-horsepower direct current, are for driving the finishing stands of the 9-inch mill. Twenty-four direct current motors of various sizes are for crane service, and all others are for general mill work.

To the Raymond Concrete Pile Co. placing the piles required.

POWER HOUSE NO. 4 AND BOILER HOUSE NO. 6.

To the Riter-Conley Co. steel work of building, about 400 tons.

Contract has been placed for 6 Sanford Riley 10 retort underfeed stokers for the new boilers.

BRIDGES.

To the Pittsburgh Bridge & Iron Works the Highway Approach to the coke plant, about 100 tons of steel. The contract for the foundations was given to the Dravo Contracting Co.

To the McClintic-Marshall Co., standard gauge railroad bridge across the Mahoning river, connecting the main plant to the new coke works, about 600 tons of steel. The contract for the piers and abutments was given to the Dravo Contracting Co., and this work is now in progress.

## Engine and Pipe Mill Contracts

Youngstown, Sept. 15. (By wire.)—The Wm. Tod Co. has received the contract for two blowing engines from the Bethlehem Steel Co. The Republic Iron & Steel Co. has awarded the contract for two pipe mills to the United Engineering & Foundry Co., Pittsburgh.

# MEN OF THE IRON TRADE

**Who they are** **Where they are** **What they are doing**

Benjamin J. Lamme, chief engineer of the Westinghouse Electric & Mfg. Co., East Pittsburgh, has been named by Secretary, of Navy Daniels as a member of the naval advisory board, which will consider questions of national defense. He was born on a farm near Springfield, O., and was educated in the country schools. Later he entered Ohio State University and was graduated as mechanical engineer in 1888. A year later he entered the testing department of the Westing-

BENJAMIN J. LAMME

house company. Soon afterward he took up design work which he has followed continuously since. In 1900 Mr. Lamme was made assistant chief engineer succeeding to the position of chief engineer in 1903. He has been one of the leaders in the development of alternating current apparatus including the induction motor, polyphase generators, rotary converters and single-phase railway apparatus. He also was a pioneer in the development of direct current apparatus for railway lighting and power work. As an electrical engineer, Mr. Lamme is known the world over. He is a fertile inventor and has to his credit a large number of important patents covering electrical apparatus. One of his duties is the chairmanship of a committee of the Westinghouse company which passes on the value and application of the various inventions brought to the attention of the company. He is a member of the American Institute of Electrical Engineers and has contributed a number of valuable technical papers to that organization. Among the prominent installations with which he has been identified may be mentioned the 5,000-horsepower revolving field Niagara Falls generators, installed in 1895; the design of single-phase motor and generator equipment for the New York, New Haven & Hartford railroad and the Philadelphia-Paoli electrification of the Pennsylvania railroad.

I. Furnyama, chief engineer of the locomotive shops, Hyogo works, Kawasaki Dockyard Co., Kawasaki, Japan, was a visitor at the Norton Co., Worcester, Mass., recently.

E. P. Harris will open up an office as agent for the Standard Steel Castings Co., Cleveland, in New York City, on Oct. 1. He will be at room 1814, 30 Church street.

H. A. Rapelye, Pittsburgh representative of the Terry Steam Turbine Co., Hartford, Conn., was one of the citizen soldiers who received military instructions at the Plattsburgh training camp this summer.

Frederick S. Conran, superintendent of the Torrington Mfg. Co., Torrington, Conn., has resigned to accept a similar position in a factory in Newark, N. J. He will be succeeded by Henry Ellis, who has been connected with the Ansonia, Conn., plant of the American Brass Co.

F. Lee Norton, vice president and general manager of the J. I. Case Threshing Machine Co., Racine, Wis., has resigned and will retire from active business to devote his attention to his large stock farm near Racine. Mr. Norton has been associated with the Case company for 26 years and formerly was treasurer.

B. W. Kerr, of the Railway & Industrial Engineering Co., Greensburg, Pa., will be the principal speaker at the first meeting of the 1915-1916 season of the Pittsburgh section of the American Institute of Electrical Engineers, which will be held Sept. 21 at the Seventh Avenue hotel. He will talk about Outdoor Sub-Stations.

R. C. Bolling, general solicitor of the United States Steel Corporation, has been elected president of an association to encourage the organization of motor machine gun batteries. This association grew out of the recent military training camp for business men at Plattsburg, N. Y., where Mr. Bolling was captain of a machine gun troop.

Louis Bloomfield, who resigned as assistant sales agent of the American Steel & Wire Co., Cleveland, Sept. 1, entered the service of that company

LOUIS BLOOMFIELD

July 15, 1901, serving five years in the operating department and nine years in the sales department, the last two years acting as assistant sales agent. He graduated from the Cleveland Law School in 1914, was admitted to the bar the same year and is giving up his career in the steel business to follow this profession.

L. S. Schmidt, vice president of the Knox Pressed & Welded Steel Co., Pittsburgh, has severed his connection with that concern and has organized the Schmidt-McCormick Co., which will manufacture pressed and welded steel specialties, in a plant at Twenty-fifth street and the Allegheny Valley railroad, Pittsburgh. Mr. Schmidt, who had been with the Knox company since it was organized, had charge of the open hearth water cooling specialties department.

# Money and Iron: Fact and Comment

## Seriousness of International Complications Does Not Materially Interfere With Business

ALTHOUGH international problems still cause some anxiety, there is abundant evidence indicating that prosperity will prevail in this country. There are still some unsatisfactory spots in business, but in general, reports are gratifying. Money is so abundant that there is some fear of too much idle cash being on hand. Crop reports continue favorable. The American market continues to absorb all securities which are sent over from Europe. The interstate commerce commission reports from 118 roads a net operating revenue of $61,734,383 in July, compared with 53,702,821 in July, 1914. Reports of gross earnings are, however, still unsatisfactory. August bank clearings made a new high record, exceeding not only that of August, 1914, by 44 per cent, but also that of August, 1913, by 15 per cent. The liabilities of failures are decreasing in volume.

The report of the American Locomotive Co. for the year ending June 30, should cause investors in war stocks to stop, look and listen. The deficit for the year was $3,241,900, compared with a surplus of $326,100 in the previous year. Its gross business dropped $20,684,000, and the plants were operating on an average of only 17 per cent of capacity. The stock of this company advanced last spring with other so-called war stocks. At 52, it is now 16 points below its high of the year and 33 points above the year's low record.

Following Labor Day, the market opened Wednesday with a little hesitation, but during the day substantial gains were made. General Motors rose to a new high record at 150; Bethlehem Steel gained 3 points.

Wednesday gains were made by the motors and railroad specialties, Bethlehem advancing 9 points, General Motors 5, Crucible Steel 3 and Tennessee Copper over 2 points. General Motors established a new high point at 255½. The last gold shipment from England proved to be less than $19,465,000, but with it came $30,000,000 in securities, bringing the total receipts of the metal and paper to about $150,000,000 since Aug. 1.

Thursday it was announced that Wall street considered it almost certain that the big loan to Europeean countries would be made. Munition shares continued to advance. Bethlehem recorded an advance of 27 points, to 326.

News from Washington, showing that the latest note from Germany was regarded as highly unsatisfactory and the request for the recall of the Austrian ambassador, tended to check bull operators Friday, but not until Bethlehem had made a new high record at 335, and General Motors at 271. During the half day Saturday, there was a decline in the market, but there was nothing like general demoralization. Although the diplomatic situation is known to be serious, the country is trusting the President and is not getting excited.

Quotations at the close of business Sept. 11, and changes in the leading stocks identified with the iron and steel industry for the week are shown in the following table:

| | Close Sept. 11 | Net Change. |
|---|---|---|
| American Can | 56 | —2¼ |
| American Can, prfd. | 105¾ | + ¾ |
| Amer. Car & Fdy. Co. | 67 | ... |
| Amer. Car & Fdy. Co., prfd. | 116½ | ... |
| American Locomotive | 52 | —1½ |
| American Locomotive, prfd. | 97½ | + ½ |
| American Steel Foundries | 51½ | —2 |
| Baldwin Locomotive | 79 | —1½ |
| Baldwin Locomotive, prfd. | 106 | — ½ |
| Bethlehem Steel | 312 | +25 |
| Bethlehem Steel, prfd. | 142 | ... |
| Colorado Fuel & Iron | 45⅜ | —2⅜ |
| Continental Can | 82 | —1 |
| Continental Can, prfd. | 103 | + ½ |
| Crucible Steel | 85¾ | +2¾ |
| Crucible Steel, prfd. | 104¼ | + ¼ |
| General Electric | 170½ | —1½ |
| International Harv. of N. J. | 105 | —1½ |
| Lackawanna Steel | 67¼ | — ¾ |
| Nat'l. Enamel'g. & Stamp. Co. | 24⅞ | —2⅛ |
| Pressed Steel Car | 60 | —3¼ |
| Pressed Steel Car, prfd. | 99⅞ | — ⅜ |
| Pullman Palace Car | 159 | — ½ |
| Republic Iron & Steel | 42¼ | — ¾ |
| Republic Iron & Steel, prfd. | 101⅜ | + ⅛ |
| U. S. Cast Iron Pipe & Fdy. | 21 | +1½ |
| United States Steel | 74⅛ | — ⅜ |
| United States Steel, prfd. | 113⅛ | + ¼ |
| Westinghouse Mfg. | 114¾ | —1½ |

The following show changes in maximum quotations in stocks not listed on the New York stock exchange:

| | High for Sept. 3. | High for Sept. 10. |
|---|---|---|
| American Radiator | 360 | 360 |
| American Shipbuilding | 41 | 40½ |
| Cambria Steel | 59½ | 64⅜ |
| Chicago Pneumatic Tool | 81⅜ | 78½ |
| La Belle Iron Works | 46 | 40 |
| Lake Superior Corporation | 10¾ | 11¼ |
| Pennsylvania Steel, preferred | 82 | 85¾ |
| Stewart-Warner Speed. Co. | 66 | ... |
| Warwick Iron & Steel Co. | 10½ | 10¼ |
| Westinghouse Air Brake | 142 | 141½ |
| Westinghouse Elec. & Mfg. Co. | 59 | 58 |

## Would Block Plan

Preferred stockholders of the International Steam Pump Co., living in Holyoke, Mass., where the Deane Steam Pump Co.'s plant of the International is located, have joined forces with all the preferred shareholders in the attempt to block the plan for reorganization which has been proposed by a joint committee of stockholders and bondholders. The charge has been made that Benj. Guggenheim, one of the men in control of the International company, who was lost on the TITANIC, received $8,000,000 stock of the company in return for the Power & Mining Machine Co., whose plants show an appraisal of $1,059,423. Counsel for the preferred stockholders maintain that the entire reorganization is to be effected at the expense of themselves and that the amount of money which they are called upon to pay, either directly or as guarantor of assessments on the common stock, is more than is required. The International company was incorporated in New Jersey in 1899 and now holds some 10 companies.

## Very Poor Showing

The fourteenth annual report of the American Locomotive Co., covering the year ended on June 30, shows that the $50,000,000 corporation had the worst year in its history. Gross earnings were only $9,303,298, a falling off of $20,684,140, or about 61 per cent, compared with the 1914 gross earnings, and a falling off of about 83 per cent compared with the company's banner year of 1913, when the gross earnings were about $55,000,000. The poorest year in the company's history, in other words, showed gross earnings amounting to only 17 per cent of the gross earnings in the best year.

While the shutting down of many of the company's plants cut down the operating expenses to $10,445,900, a decrease of $16,979,286 compared with the expenses in the previous year, this expense caused an operating deficit for the year of $1,142,601. After paying interest charges the deficit for the year was $1,491,980. This wholly wiped out last year's surplus of $2,076,127, making the net loss on the year's operation, compared with 1914, $3,568,107. The 7 per cent dividend on the preferred stock, amounting to $1,750,000, was paid as usual, and had to be taken from the surplus of other years, thus necessitating a trimming of the surplus account by a total of $3,241,980. There remained on the surplus account, as of June 30, 1915, $8,293,677.

In view of the many reports of the millions in war orders said to have been received by the American Locomotive Co., the financial district had expected a better annual report. One of the current rumors had credited this company with at least $30,000,000 of war orders. In this connection, however, it was recalled that these reports were not cir-

culated until April and May. Any work on war contracts, therefore, would not have been reflected to any great extent in the operation up to the end of June

There are indications in the report, however, that the American Locomotive Co. did get some war contracts. The amounts of these contracts are not disclosed, but certain items in the balance sheet throw some light on the situation. There is an item called "contract work in course of construction" for $1,738,651, but this item, it is understood, applies only to domestic work and has nothing to do with foreign orders. One item on the assets side of the balance sheet is for $11,646,537 and is listed as "cash in banks, including unexpended advances received on contracts." Another item in the assets column is for $6,160,136, and is listed as "accounts collectable, including advances made on contracts." On the debit side of the balance sheet appears an item for $14,156,917, which is listed as "accounts payable, including advances received on contracts."

The only direct reference in the body of the report to big foreign business which was interpreted as bearing on the war contracts is contained in the following remarks by Sylvanus L. Schoonmaker, chairman of the board of directors:

"During the first nine months of the year there was only a small amount of new business booked. Since April, however, this company has secured large foreign orders for delivery during the fiscal 1915-1916 year. In addition to these the company had $5,838,235 of locomotive orders on the books June 30, 1915, as compared with $4,162,356 on June 30, 1914.

"In view of the new foreign business on the books and the prospect for an increase in the demand for locomotives, which we are amply prepared to take care of, the outlook for the coming year is promising."

Commenting on the condition of the company's business in the last year, Mr. Schoonmaker says:

"The outbreak of the European war at the beginning of August, 1914, made a continued depression in our business more than probable. Accordingly, the curtailment in salaried forces carried out in previous years was supplemented by a further retrenchment in expenses. This included a reduction in salaries of all the executive officers and salaried employes. In addition, work upon the few orders that were received was concentrated at the Schenectady works, so that the other plants could be closed and the manufacturing expenses cut down. The Schenectady and Cooke plants, operating at a low percentage of capacity, were the only plants out of the eight owned by the company which were not closed either entirely or for a large part of the year.

"The productive operations of the company as a whole averaged for the year about 17 per cent of capacity and at times ran as low as 8 per cent of capacity."

The report of the company will be formally submitted to the stockholders at the annual meeting on Oct. 19.

## Financial Notes

The Cambria Iron Co. has declared the regular semi-annual dividend of 2 per cent, payable Oct. 1 to stock of record Sept. 15.

A receiver has been asked for the D. T. Williams Valve Co., Cincinnati, by D. T. Williams, claiming mismanagement by the present officials. D. T. Williams was until recently president of the company, but retired when he lost the controlling interest. The assets of the company are given at $375,730, and the liabilities at $72,000.

The property of the Brown Engine Co., Fitchburg, Mass., has been sold at trustee's foreclosure sale for $21,750. The estate was sold in two lots, each being bid in by those acting in the interests of Moses J. Pereault, Fitchburg, who held the bonds of the company. The land and buildings brought $19,000 and the personal property $2,750.

At the recent effort to sell the assets of the Prime Steel Co., Milwaukee, a bid of $21,255 was received, but it was not regarded as high enough, as the assets had been appraised at $68,000. Resale has been ordered by the referee in bankruptcy and sealed bids are to be received up to and including Sept. 20. Julius J. Goetz, 507 Montgomery building, Milwaukee, is a trustee.

An involuntary petition has been filed in federal court at Milwaukee against the Lyons Boiler Works, De Pere, Wis. The petitioning creditor is Walter D. Hawk, Chicago, who has a claim of $80,000 on five notes. Mr. Hawk claims the Lyons company's liabilities are $100,000 and the assets only $60,000. The People's Savings & Trust Co., of Green Bay, Wis., has been appointed receiver.

## Will Show Tube Making

At the meeting of the Purchasing Agents' Association of New York, at the Hotel Breslin, Sept. 21, the National Tube Co., of Pittsburgh, will present three reels of motion pictures in colors showing the various processes used in the manufacture of pipe from the mining of the ore to the finished product. C. F. Roland, of the metallurgical department, will explain the films.

## Buys Rails

**For Alaska Railroad—Seaboard Air Line Also Places Order**

New York, Sept. 15. (By wire.)—The Seaboard Air Line has closed for 7,000 tons of rails with the Tennessee company. The government orders 5,000 tons of rails and track supplies from the Colorado Fuel & Iron Co., as the first requirement of the new Alaska railway. The quotation of 1.40c, Pittsburgh, for first quarter on plates, shapes and bars is spreading among producers, including the Steel Corporation. A number of good sized contracts have been booked at this figure. Makers still are exerting no great efforts to increase sales.

Operations of the Steel Corporation are running about 95 per cent of ingot capacity.

## As Expected

**Unfilled Tonnage Statement Shows Very Little Change**

Unfilled orders of the Steel Corporation at the end of August, announced Sept. 10, were practically as foreshadowed in these columns, in that the new business entered and the shipments made during the past month were about equal. The figures show a loss in August of 20,085 tons as compared with a gain of 250,344 tons in July. The order book on Aug. 31 stood at 4,908,455 tons, which remains the largest since the close of February, 1914. Shipments in August of the Steel Corporation were larger than in July and are believed to have been at the highest record in history. This fact, together with small inclination of the leading producer to add to obligations, which at this time are of a very active character, explains the small tonnage change.

## Will Add Four Furnaces

The Central Steel Co., Massillon, O., which recently completed a new open hearth steel plant, will increase its capacity. Cranes, ladles, ingot buggies, etc., will be purchased; S. R. Smythe Co., Pittsburgh, will build four additional 50-ton open hearth furnaces for the Central company. The present soaking pit and crane capacity is sufficient to handle the output of the four new furnaces which will be completed about March 1.

The Vilter Mfg. Co., Milwaukee, ice and refrigerating machinery and corliss engines, has announced that it will not accept any orders for war munitions in whole or in part, and states that it has already declined numerous tenders of such contracts.

# Producer Gas for Heat Treating

## Details of an Installation in a Prominent Wisconsin Automobile Factory—Comparison With Fuel Oil

PRODUCER GAS is used in large quantities in the iron and steel industry, but until recently it has not been employed to any extent for firing heat-treating, case hardening, annealing or similar furnaces. For this purpose a cool, clean, stable gas is necessary, requiring an improved type of producer for its generation. Gas of this character, however, has certain advantages and is being rapidly adopted in the plants of progressive manufacturers. Prominent among these plants is that of the Mitchell-Lewis Motor Co., Racine, Wis., where 17 heat treating, case hardening and annealing furnaces, two cyanide furnaces and a pipe bending furnace are operated on producer gas. This plant has been in operation a sufficient length of time to demonstrate its success, particularly in relation to fuel oil which formerly was used.

The gas-making equipment includes two 96-inch producers, together with the necessary scrubbers, tar extractors, etc., furnished by the Smith Gas Power Co., Lexington, O. The producers are 12 feet high, with a 9-inch brick lining. They are rated at 2,500,000 British thermal units per hour, and are designed for a 20 per cent overload for two hours. At the present time, owing to shop conditions, but one producer is operated under a heavy overload, the output being about 5,000,000 British thermal units per hour, requiring 560 pounds of coal per hour. Under these conditions, about 30,000 cubic feet of gas are generated per hour; the gas is delivered to the mains under a pressure of 1¼ pounds per square inch.

The producers are provided with three tar extractors of the glass wool type developed by the Smith Gas Power Co. As described in *The Iron Trade Review* April 16, 1914, this apparatus is provided with a diaphragm of glass wool through which the tarry gas is passed. The diaphragm does not retain any of the tar, but changes its physical state. On the entering side, the tar exists in a large number of minute particles, ordinarily known as tar fog. After passing through the diaphragm, these particles coalesce, so that on the discharge side they are of relatively large dimensions. In fact the pellets are so large that they can no longer be carried forward by the gas current and immediately separate out by gravity. The extractors at the Mitchell plant have 12-inch diaphragms.

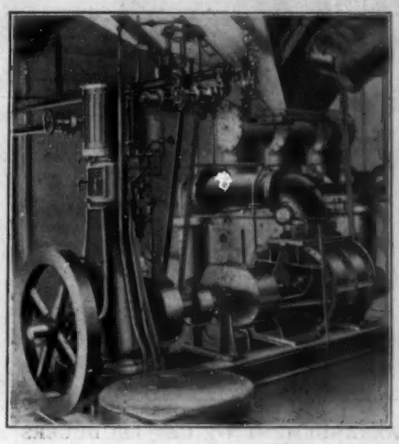

FIG. 1—ENGINE DRIVEN GAS EXHAUSTER

The producers, which are of the suction type, are provided with a positive exhauster furnished by the Connersville Blower Co., Connersville, Ind. It displaces 3.6 cubic feet of gas per revolution and is operated at 345 revolutions per minute, being connected to an 8 x 8-inch high pressure steam engine.

An overhead coal bin, which is filled by a bucket elevator, is provided in order that the producers may be fed economically by gravity. Majestic producer coal obtained from mines in southern Illinois is used; it costs $2.85 per ton delivered. The proximate analysis of the coal is as follows:

| Constituent. | Per cent. |
|---|---|
| Water | 7.98 |
| Volatile combustible | 31.75 |
| Fixed carbon | 54.71 |
| Ash | 13.54 |
| Sulphur | 1.21 |

This coal has an average heating value of 12,340 British thermal units per pound. The heat value of the resulting gas, as determined by a Smith recording gas calorimeter, averages 170 British thermal units per cubic foot.

In heat treating work it is advantageous to keep the sulphur in the gas as low as possible. This is best accomplished by driving the producer at a low rate with low temperatures in the fire, which of course, tends to re-

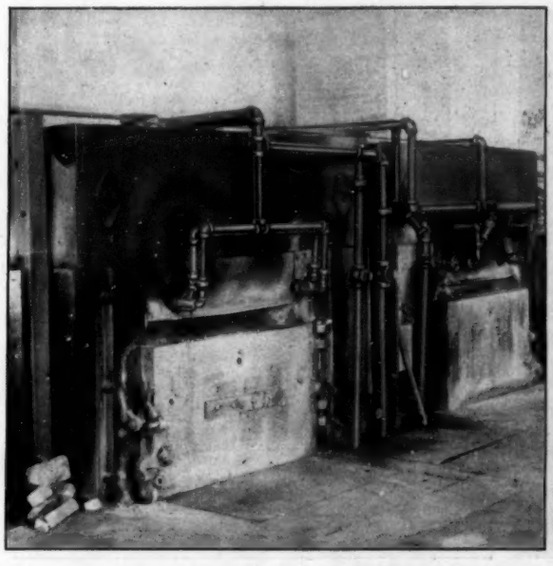

FIG. 2—OVER-FIRED CASE HARDENING FURNACE PROVIDED WITH TWO GAS BURNERS

FIG. 3—PORTION OF A BATTERY OF PRODUCER GAS-FIRED HEAT-TREATING FURNACES

duce the quantity of the sulphur roasted from the ash.

Inasmuch as the gas is clean and cool and practically free from tar, it is conveyed from the producers to the point of utilization in ordinary pipes. Brick-lined mains are unnecessary. A small sump is provided near the delivery end of the line in order to catch any tar which may accidentally be carried over with the gas. The tar collected in the sump is drained into the sewer approximately once a week. The gas is consumed in burners of very simple construction. As shown in Figs. 5 and 6, the burner consists simply of a special casting into which the pipes carrying the air and gas are screwed. The air pipe is ¾-inch and the gas pipe 1¼ inches in diameter. The mixer pipe, which is inserted into the furnace, is 2 inches in diameter. The burner operates on the injector principle and the air and gas are thoroughly mixed before they are ignited. Fig. 5 shows how the burners are fitted to the furnace and indicates the nature and arrangement of the pipe connections. The operation of the burner is controlled entirely by the gas and air valves shown at the right in this illustration.

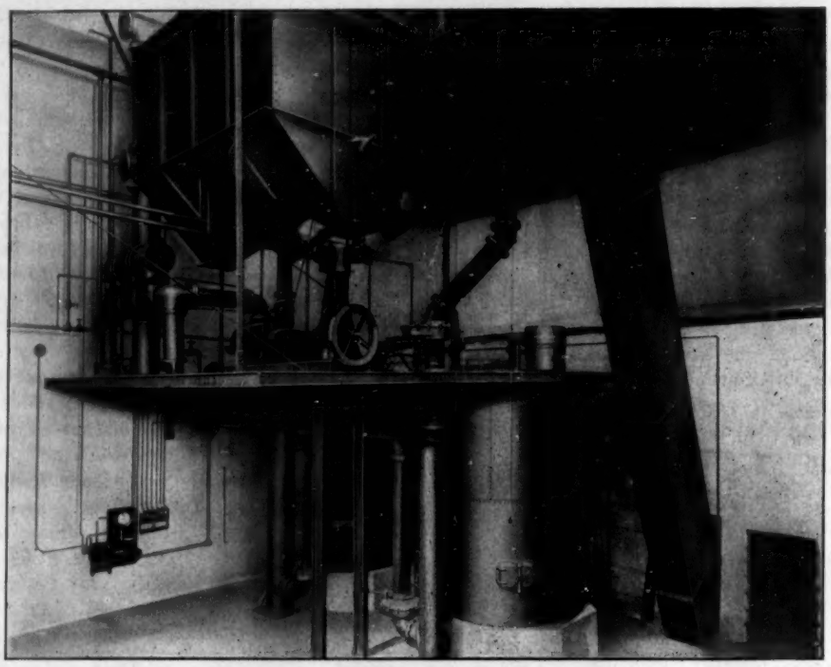

FIG. 4—GENERAL ARRANGEMENT OF GAS PRODUCERS AT MITCHELL PLANT

The equipment at the Mitchell plant includes four Brown & Sharpe case hardening furnaces, 56 x 60 x 45 inches; two Brown & Sharpe over-fired, case hardening furnaces, 62 x 66 x 51 inches; six Brown & Sharpe furnaces 72 x 26 x 30 inches used for annealing drop forgings and five heat treating furnaces 32 x 62 x 22 inches designed and built by the Mitchell company. In the foregoing dimensions the height of the furnace is given last. These furnaces originally were designed for burning fuel oil and were modified for producer gas by the introduction of suitable combustion chambers. In the smaller furnaces, the combustion chambers are under the floor of the heating chamber, suitable flues being provided to obtain the maximum possible heating effect from the gases. Two of the larger furnaces, Fig. 2, are of the over-fired type with an arched checker work separating the combustion chamber from the heating chamber. It should be stated that more efficient and satisfactory results could have been obtained if the furnaces had been designed originally for the utilization of gas instead of oil. The case-hardening furnaces are operated at about 1,700 degrees Fahr.; the drop forge annealing furnaces are operated at lower temperatures ranging from 1,400 to 1,600 degrees; the range of temperatures in the heat treating furnaces is about the same as that in the annealing furnaces. The air is delivered to the burners at a pressure of six ounces per square inch, centrifugal blowers being provided.

Fig. 3 shows a view of the heat treating furnaces, the gas burners being located at the side. The large Brown & Sharpe over-fired case hard-

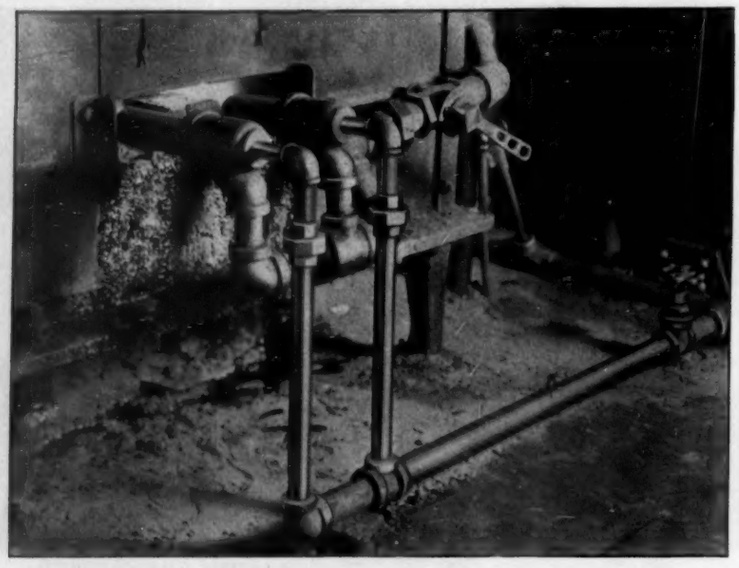

FIG. 5—DETAIL OF GAS BURNER, SHOWING PIPE CONNECTIONS

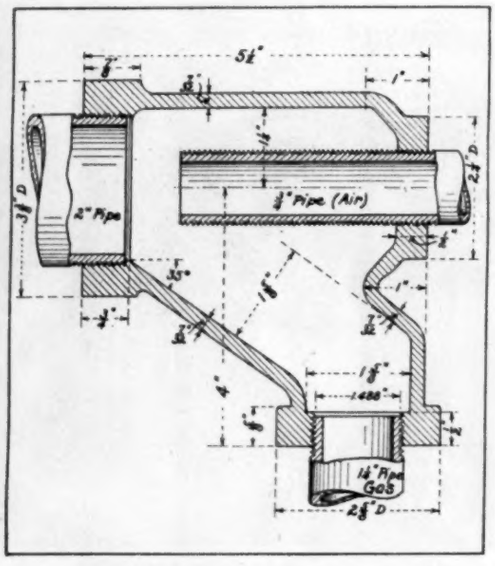


FIG. 6—SECTIONAL VIEW OF GAS BURNER

ening furnaces mentioned previously are shown in Fig. 2. This illustration clearly indicates the arrangement of the burners and piping for gas and air. Each furnace, it will be noted, is provided with two burners. The Mitchell company also has applied producer gas very successfully to its japanning and enameling ovens. One of these ovens, which is 65 inches wide, 92½ inches long and 86 inches high inside, is provided with two gas burners, which have sufficient capacity to heat it up to 350 degrees Fahr. in nine minutes. These ovens ordinarily are operated at a temperature of 345 degrees. The burners are situated in the oven chamber, through which the products of combustion pass. The construction of the burner is shown in Fig. 7. The gas enters through a ¾-inch pipe which terminates inside the 2-inch air inlet pipe. The mixture is conducted to a 5-inch pipe 2 feet long, from which it escapes through numerous small holes.

One of the advantages of producer gas is that it increases the speed of operation and consequently the output. With oil, it requires about 1½ hours to bring the heat treating furnaces shown in Fig. 3 up to their maximum temperature of 1,400 degrees Fahr. With gas these furnaces can be brought up to heat in about 15 minutes, although this time is too short to secure uniform temperatures throughout the furnace. Usually with gas about an hour is provided to bring the furnaces up to heat. If the furnace is heated up too rapidly there is a tendency to scale the metal. With gas it is estimated that two men get out the same amount of work that formerly required three men. The gas is produced at a cost of approximately 4.3c per thousand subic feet. It is said to be cleaner in operation than oil and much easier to manipulate. The furnaces should be designed to burn the gas completely, not only for reasons of economy, but in order to insure a product of satisfactory quality, inasmuch as unburned carbon monoxide seems to have a tendency to blister the steel. The large furnaces shown in Fig. 2 consume about 2,083 cubic feet of gas per hour, when utilized for case hardening operations.

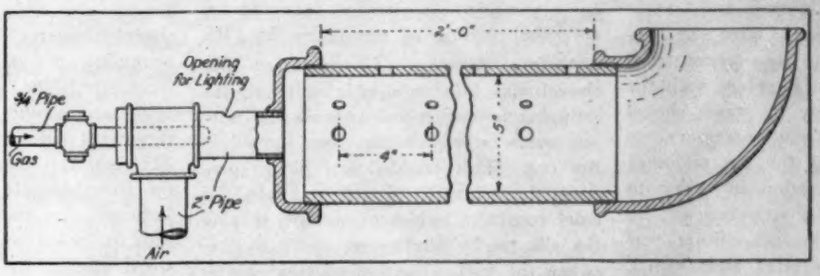


FIG. 7—DETAIL OF BURNER FOR ENAMELING OVEN

# Open Pit Mining on Gogebic Range

BY W. C. HART

AS OPEN pit iron mining on an extensive scale has been unknown heretofore on the Gogebic iron ore range, mining men generally have been interested in the recently developed Wakefield mine, at Wakefield, Mich. This property is in Section 17 of township 47 north, range 45 west, Gogebic county, Mich. Lying, as it does, a half-mile south of the formerly supposed line of the footwall in this portion of the range in a district where mining has been going on for 30 years, the new property does credit to the knowledge and persistence of Robert Selden Rose, geologist of Marquette, Mich., through whose instrumentality and under whose direction the drilling, which developed this ore body, was undertaken by the men now forming the operating company. The history of earlier attempts to locate the footwall and find an orebody in this south area would be interesting if space permitted. Such attempts have been made at various times for a number of years. Exploration was also attempted by test-pitting. The nature of the surface material made it impossible to sink these pits to any great depth and the work was abandoned before ledge was struck. Several pits were still in evidence when the writer first came to the property. Some diamond drilling was also done on Sec. 17, the hole which came nearest to finding the ore being an inclined one pointed toward the present footwall, 100 feet west and about 800 feet north of the present *A* Shaft and cutting under the ore body now developed.

The first drill hole of the successful exploration was located 500 feet due south of the hole put down by the last exploration company. Drilling was started in this hole July 16, 1912. A churn drill was used for the work and the results obtained were sufficiently satisfactory to warrant continuing the drilling of the property, first with one churn drill, and later with several diamond drills; drilling being carried on until sufficient ore had been developed to warrant taking out a lease and sinking a shaft.

### *Sink Vertical Shaft*

The first shaft was started on Feb. 19, 1913, about 300 feet south and 100 feet east of the first drill hole. There are no especially interesting features in connection with the sinking of this shaft. It is a rectangular, vertical, timbered shaft 12 x 18 feet, and consisting of five compartments, two for the hoist, one for the cage, one for ladders and one for pipes and wires. The first 30 feet of the sinking presented some difficulty on account of the quicksand, but thereafter the progress was unbroken and stations were cut and levels opened at depths of 80 feet, 150 feet and 250 feet. Fifteen thousand tons of ore were mined on the 80-foot level for the first shipment from the property in October, 1913.

On Aug. 1, 1913, a second shaft was started 2,000 feet east of the first. As there were 90 feet of surface at this point, a large percentage of which was quicksand, a drop shaft was determined upon. This shaft was solid-timbered and rectangular with a bell-mouthed, steel-shod, sinking shoe. The dirt was hoisted by a bucket swung from an aerial tram. The shaft was finally ledged, at which point the size was increased to 12 x 18 feet. Sinking was continued to the 400-foot level with steel sets, and exploratory work was begun. Up to the present date, no ore has been shipped from this shaft, although some exploration work has been done by rock drifting.

While the underground development had been going on at *A* Shaft, drilling on the west half of Section 17 had shown the possibility of an ore body capable of development by open pit

A paper read at the 20th annual meeting of the Lake Superior Mining Institute, Crosby, Minn., Sept. 6 to 9, 1915. The author is superintendent, The Wakefield Iron Co., Wakefield, Mich.

methods. This necessitated the extension of the plans of drilling for several reasons. First, it was necessary to determine the exact nature and extent of the ore body in order to figure the quantities and the nature of the overburden; second, the nature and extent of the intrusive dikes must be determined in order to be certain that these dikes would not interfere with the removal of the pit ore by steam shovel methods; third, it was necessary to know the quantity of the ore tributary to steam shovel operation in order to plan the limits of the stripping and to determine whether the proposition was practical from an operating and from a financial standpoint. Close drilling was also necessary in order to lay out the plans of the pit in such a manner that merchantable ore would be available and a continuous operation assured at all times during the life of the pit. This drilling would have added an unnecessarily heavy investment charge to the property had underground methods still been found necessary. It was, however, absolutely essential to the proper development of an open pit mine in a district where the problems likely to be encountered were practically unknown.

Stripping was started on Oct 1, 1913. The equipment for this work consisted of two 100-ton Bucyrus steam shovels, four 50-ton Baldwin locomotives, several Western Wheeled Scraper Co. air-dump cars of 20 cubic yards capacity, and 85-pound steel rail. The stripping operation was pushed continuously throughout the winter months, and the first ore was uncovered on April 7, 1914. By July 10, 1914, sufficient ore was uncovered to enable the Wakefield Iron Co. to start one of its own shovels in the ore. The amount of ore uncovered at that time was small, as the stripping operators had not had sufficient time to clean up a very large area. For this reason the ore loading was slow and uncertain, but operations were carried on, more or less continuously, until the close of navigation, the first year's shipment from the pit being 240,000 tons.

### *Continue Stripping Ore*

During the shipping season and until Jan. 1, 1915, stripping operations were continued, completing a contract for approximately 2,000,000 cubic yards of overburden. On Jan. 1, 1915, the Wakefield Iron Co. took over the stripping work and put two Bucyrus shovels and four Baldwin 50-ton locomotives at work on double shift to clean up sufficient ore for the 1915 shipment A third shovel, identical with the two engaged in stripping, had also been purchased for the ore work. A number of the Western Wheeled Scraper Co.'s 20-cubic-yard air-dump cars and several hundred tons of new 85-pound steel rail, in addition to all the steel purchased from Butler Bros., completed the stripping equipment. Stripping was pushed continuously throughout the winter months and an additional 500,000 cubic yards of overburden removed before the opening of navigation in 1915.

At the opening of navigation one shovel was left on double shift on the stripping operation and two shovels with one crew on each shift were started in the ore. This enabled the pit to produce the mixture of ore required for sale contracts without unduly moving the shovels by alternating one crew between the two. The use of two shovels in the ore also made it possible, in case heavy shipments were required for short periods of time, to put two crews in ore until the requirements were filled. Later in the season a fourth shovel was added to the equipment. This is a lighter model, a 70-ton Bucyrus, to be used mostly in clean-up cuts on the ore and in the lighter stripping cuts. With two shovels in ore and two in stripping a steady output can be maintained. Even when ore shipments become slack and there is nothing for the ore shovels to do, without the expense of moving a shovel, the entire crew can work on stripping until more ore is required. The fact that the company is carrying on both ore and stripping operations makes for great flexibility in the work and tends to reduce the cost of both. This season, to August 20, 1915, about 275,000 tons have been mined from the open pit.

The body of ore tributary to the open pit, as well as the underground ore at the Wakefield mine, is similar in its formation to other ore bodies on the Gogebic range. A quartzite footwall dipping about 60 degrees to the north, striking east and west and overlaid by a band of red slate, varying in thickness from 10 to 40 feet, is intercepted by a dike striking parallel to the footwall and dipping about 25 degrees to the south. The ore concentration has taken place in the trough formed by this footwall and dike. The whole north side of the open pit ore body is covered by a flow of diabase, forming the hanging or capping.

For the early development of the pit an area was chosen which represented a minimum amount of stripping and a maximum overlying rock and lean ore. The ore body was opened under the best obtainable conditions, and an opportunity afforded to study the detrimental features as the pit widened and deepened into an area not so favorable to pit operation. The shallowest overburden was found just west of the present *A* Shaft, at the contact of the ore with the footwall. At this point there is only 40 feet of overburden; westerly the overburden increases in depth on the footwall side, reaching a maximum of 115 feet. The top of the ore drops gradually to the north from the contact with the footwall, until it reaches the diabase flow. Here it dips sharply under this flow, arbitrarily determining the north limit of possible stripping. The ultimate plans contemplate a maximum depth of stripping on the north side of the pit from 150 to 175 feet, this depth taking the cut well into the diabase flow. There is not sufficient ore under the diabase to warrant stripping any greater depth. The small amount of ore under this diabase and beyond the stripping limits will be scrammed into the completed pit and picked up by steam shovels as in ordinary stock-pile loading; some of the ore remaining in the bottom of the pit after scramming is completed, will be milled to a level driven under the final bottom of the pit; and the remainder of the ore will be mined by the usual underground methods.

### *Use Switchback Tracks*

Unlike the larger pits on the Mesabi range, in which a circular system of tracks is possible, depth on the Wakefield pit will have to be gained in the haulage system by the use of switchbacks. The pit being long, narrow, and extremely deep, there will have to be several of these switch-backs to reach the bottom. These will tie up some of the ore which would otherwise be tributary to the open pit steam shovel tonnage. This will have to be mined by hand from the slopes, and milled after the shovel operation is completed. The track system for the final layout contemplates the use of a maximum gradient of 3 per cent.

The problem of handling surface drainage to minimize the quantity of water flowing into the pit, as well as to care for such water as flows from the banks and within the limits of the pit during spring freshets and in times of heavy rainfall, is one to which all open pit mining is subject, and is especially important in the Wakefield pit. Situated in the bottom of a natural drainage area, the pit was subject to a flow of several gallons of water within its limits for every inch of rainfall. This added to the difficulty of the operation and was also detrimental to the ore, owing to its high porosity and its capacity to absorb moisture. A definite relation was found between the amount of rainfall and the moisture in the ore.

To drain the ore, as well as take care of the flow of rain water through the pit, a system of drifts was developed on the various levels. At the lowest point in the pit a drill hole cased with 5⅝-

inch pipe was put down to the 250-foot level. A valve was put on the casing and a sump built. This was connected to the main sump at the shaft by a system of launders. The casing was also cut on the 150-foot level, a valve being put on the pipe at this point, and a similar arrangement of sump and launders built to carry the water to the auxiliary pump station at this level.

In times of normal flow, all the water is carried direct to the 250-foot level and pumped to the drainage ditch. In times of rain the valve on the 250-foot level is partly closed to allow only such water to flow to this level as can be handled by the present pumps. The balance of the water is backed up to the 150-foot level pumps. In case of extraordinary rains, where the pumps on both levels are unable to handle all the water the valve on the 150-foot level is partly closed, allowing the surplus water to accumulate in the bottom of the pit until the extreme flow of water abates. The pumps having relieved the water from the pit, the valves on both levels are opened, and the normal system is resumed. As a further precaution the pump station on the 250-foot level is 7 feet above the main drift; and a horseshoe shaped sump drift, 6 feet below the main one, carries the incoming water around the shaft, from the shaft station to a point under the pump station. In case of flood this would allow the whole bottom level to serve as a reservoir without drowning the 250-foot level pumps. No originality is claimed for this arrangement, which is universally adopted in good mining practice where a heavy flow of water is anticipated.

### *Big Drainage Ditch*

To minimize the amount of surface water flowing into the pit, a steam shovel drainage ditch was started in the low country, 1,000 feet east of the pit and dug on an average grade of 5 per cent west along the south final limits of the pit. The pit itself lay in so deep a hollow that this ditch, in order to maintain its grade, finished at a point several hundred feet south of the final limits. To prevent the water in the unprotected area between the ditch and the pit from flowing into it, a waste dump of stripping material was started on the north side of the ditch and carried north on an ascending grade, so that the water falling upon it flows to the ditch. It empties into the Little Black river at the extreme east end of the property. As a final precaution a berm will be built on the south side of the pit, with a uniform grade the entire length, starting at the west and ending at the east end. In this berm a launder will be built of sufficient size to carry all the water not caught by the steam shovel drainage ditch.

The red slate overlying the footwall quartzite, and the intrusive dikes throughout the ore body, are two factors not encountered in a Mesabi pit. The red slates, as previously mentioned, lie close on the footwall and vary in thickness from 10 to 40 feet. All of this material must be moved in the development of the ore body. The footwall, especially at the western end of the pit, is steep; and this slate, disintegrating and slipping into the ore, contaminates it and retards the operation by the vast amount of hand labor necessary to separate it from the ore in case it is not removed on each successive bench. Where the line of demarcation between this slate and the overlying ore is not well defined, hand labor is necessary to make a clean separation. The same is also true in the case of the intrusive dikes. In planning track grades for the steam shovel cuts, careful determination of the position of these dikes must be made in order to make separation with a shovel possible and to avoid excessive hand labor. Some portions of these dikes are ferruginous, running as high as 40 per cent in iron. Such material is put on the No. 2 lean ore stockpile for use in time to come when it will have a commercial value. Other portions of the dike, containing no iron, are sent to the waste dump.

The diabase dike, overlying the north slope of the ore body, is soft at the top, growing harder as the cuts deepen and finally reaching the hardness of solid ledge at its greatest depth. The cost of removal of this dike is great as compared with ordinary stripping material, and care had to be exercised in determining the north stripping limits, to avoid a total cost which would be excessive for the amount of tributary ore. The separation of this dike from the ore body causes no particular difficulty, as the line of demarcation is well-defined.

The grading of the ore in an open pit on the Gogebic range is more complicated than in most pits on the Mesabi range. The only analysis of ore in each successive cut is that obtained by a study of the nearest preceding one, the nearest drill hole sections, the results of such auxiliary pits as have been sunk in the area, and the underground drifts nearest the cuts. The ore in several cars loaded in one move of a shovel often varies as high as 3 per cent in iron and as much in manganese in occasional high manganese areas. Unlike an underground operation, where only such places are mined as will produce the desired grade, the shovel must push through the cut regardless of the ore encountered, in order to develop the proper grades for tracks and to shape the pit properly. If the ore is undesirable for immediate shipment it must be stocked on surface and picked up later by a steam shovel, at times when direct pit ore is of such grade as to warrant the mixture. The above conditions necessitate a thorough grading-system both at the mine and at the docks, and involve numerous clerical details in keeping account of the analyses of all cars leaving the mine and their position in the dock so as to load the boats with only the desired ores and to get a uniform mixture. Considering the conditions, lower lake checks on cargo analyses under this grading system have been very satisfactory.

As to the ultimate possibilities of production of ore by steam shovel methods from the Wakefield pit, plans have been made so far as they are possible with present information. These are based on the removal of overburden to a depth of from 150 to 175 feet on the north side of the pit, as previously stated. Slopes are figured in surface material at 1 to 1; in hard dike and rock at ¼ to 1; and in ore at ½ to 1. As a rule 25 foot berms are used for the protection of the pit, except in cases where track benches form the berm. Track grades are planned on a maximum of 3 per cent. The depth to which ore can be mined and consequently the tonnage tributary to open pit methods, will depend on the above factors.

### *Unsolved Problems*

If the angle of repose of the various materials conform to the above figures, the estimated tonnage will hold out, except as that tonnage may be cut down by intrusive dikes at present unknown. If these slopes do not hold out, a less tonnage will be available for open pit operation and a greater tonnage will have to be mined by milling and underground methods. This, and a number of other important factors in the development of the Wakefield pit, will depend on the conditions which will arise in the future. The pit is in its early stages and all the problems connected with its development have by no means been encountered nor solved.

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W. S. Burgess has disposed of his interest in the Stoddard-Burgess Co., brass and aluminum founders, 426 South Clinton street, Chicago. The business will be continued by E. B. Stoddard. Mr. Burgess will engage in business as a manufacturers' representative in the central west. Prior to his connection with the Stoddard-Burgess Co. he was employed in the capacity of salesman with the Imperial Brass Mfg. Co., Chicago.

# Gas Vs. Electrically Heated Ovens

## A Discussion of the Advantages of Clean Cold Producer Gas for Firing Enameling Ovens—Costs Compared

BY GEORGE H. TROUT

THE advantages claimed for the use of electric heat in enameling ovens are "increased production, lessened fire risk, and increase in quality of product, due to the absence of air suction."

The "increased production" is due largely to absence of moisture in the oven. Water is the product of the combustion of hydrogen and air, and since city gas and natural gas contain a large percentage of hydrogen the products of combustion in the oven would contain a large percentage of water vapor which would have a tendency to slow down the baking process.

The claim for "lessened fire risk" may be mentioned as advantageous, but with present methods of construction it is very easy to install fireproof gas-fired ovens. This is true especially of the muffle type of oven, where it is impossible for an unburned mixture of gas and air to get into the oven and cause explosions should the gas flame become extinguished or be turned on without being ignited.

The "increase in quality of product" is undoubtedly due more particularly to the absence of the products of combustion within the oven. The same argument holds true in this case as in the case of increased production; that is, the high moisture content of the products of combustion together with foul gases, has a tendency to dull the surface of the finish and at times causes small bubbles which break and create a rough surface, which looks like small particles of dust.

The same advantages claimed for the electric oven can be realized in a gas-fired oven of the muffle type where the heat is applied indirectly through the walls of the furnace, or from pipes located within the furnace through which the products of combustion pass. In this way the heat in the oven is radiant heat, which is identical with that radiated off the coils of the electric heaters. It is obvious that the condition within the furnace would be the same in either case.

The kind of ovens we are discussing have recently been installed by the Aluminum Co. of America at its No. 3 plant at Niagara Falls, N. Y., from designs furnished by Arthur L. Stevens, consulting engineer, Chicago. These ovens are supplied with producer gas, are heated to a temperature of from 700 to 800 degrees Fahr., and are used in annealing aluminum. The temperatures within the oven are very uniform, and it is possible to use thermostatic control when that would be of advantage. It is possible then to maintain uniform temperatures within the oven in the same manner as with electric heat.

*The use of electric ovens in enameling automobile parts was explained in The Iron Trade Review, July 29. This practice, which marks an innovation in the handling of this class of work, was first adopted at the plant of the Willys-Overland Co., Toledo, O. The article aroused considerable discussion and George H. Trout, of the Smith Gas Power Co., Lexington, O., submitted the accompanying interesting communication which sets forth clearly the relative merits of gas and electrically heated ovens, from the viewpoint of builders of gas equipment.*

The advantages of the producer gas-fired indirect ovens compared to electric ovens are greatest in the difference in cost of operation.

### *Cost of Power*

Referring to statements made in the article under discussion, we note that the Willys-Overland Co. will install 48 of these electric ovens, and that a connected load of approximately 20,000 horsepower will be required to heat them. We assume that on account of the cooling down, discharging and charging periods of the oven, no more than half of these ovens will be using power at any one time. For this reason the average load will be considered in our figures as 10,000 horsepower per hour. If the average load were only one-fourth of the connected load, the figures we are presenting would be merely cut in half.

Let us assume that electric ovens have 100 per cent efficiency, as the heat made is radiated directly into the oven. One horsepower is equivalent to 2,545 B. T. U. and 10,000 horsepower would, therefore, equal 25,450,000 B. T. U. per hour required within the ovens for baking enamel.

The gas-fired ovens will have an efficiency of from 15 to 30 per cent, depending upon conditions, and for purpose of this comparison we will assume an average efficiency of 22½ per cent. We will, therefore, require,

$$\frac{25,450,000}{22.5} \times 100 = 113,100,000 \text{ B. T. U. per hour in gas.}$$

The producer will operate at 70 per cent efficiency. We will, therefore, require,

$$\frac{113,100,000}{70} \times 100 = 161,600,000 \text{ B. T. U. per hour in coal.}$$

The coal will have approximately 13,000 B. T. U. per pound and we will, therefore, require,

$$\frac{161,600,000}{13,000 \times 2,000} \text{ or } 6.22 \text{ tons per hour.}$$

### *Cost of Operation*

We will assume a coal cost of $2.50 per ton. On plants of the size required for this capacity, the total cost of gasification, including interest, depreciation, labor, water and power, would be from 80 cents to $1 per ton of coal gasified. We will, therefore assume a gasification cost of $1 per ton. The total cost of operating 24 ovens for one hour would then be as follows:

| | |
|---|---|
| 6.22 tons at $2.50 | $15.55 |
| Gasifying this coal at $1 per ton | 6.22 |
| Total cost per hour | $21.77 |

This is equivalent to 10,000 horsepower hours if the ovens were operated electrically, and we will assume that power costs 1 cent per kilowatt, or 0.67 cents per horsepower hour. It would, therefore, cost 10,000 × $0.0067, or $67 per hour. This shows a saving in favor of gas-fired ovens of the difference between $67 and $21.77, or $45.23 per hour.

On the basis of a 10-hour day, for 310 days per year this saving would amount to $140,213. On a basis of a 24-hour day, 310 days per year, the saving would be $336,511.20.

We, of course, do not know exactly what would be the average number of ovens under fire per hour. In order that the average saving per hour per oven can be determined, we sub-

(*Continued on page* 552c.)

# How to Select Proper Mill Controllers

## Second of Two Articles on Alternating Current Controllers for Induction Motors —Typical Installations for Steel Mill, Mine and Dock Operations

BY ARTHUR SIMON

THE VARIOUS applications of the reversible automatic controller in steel mills and allied industries requires many special features, and a discussion of some typical applications of these controllers will be of interest.

Electrically-operated shovels and draglines have not been discussed very much in electrical literature, though they present some very interesting problems. The first shovel installations used direct current motors, and it was considered not only desirable but absolutely necessary to build the controller and the motor so that the electric shovel would exactly duplicate the operating cycle which was found the most suitable for the older steam machines. The first installations were not quite as successful as had been expected, and designers have gradually come to the conclusion that it is best to somewhat modify the operating cycle of the shovel, or, at least, the mechanical design of the shovel in order to fit the electric motor. On account of the necessity of transmitting the power to the shovels, usually over long distances, most of the shovels which were installed in late years are equipped with alternating current motors. Shovels of capacities ranging from 60 to 100 tons are equipped with three motors, one for hoisting, one for the swinging and one for the thrust motion. Except on the smaller machines, all motors are controlled by full automatic controllers. On the smaller machines, the thrust motion has a drum controller.

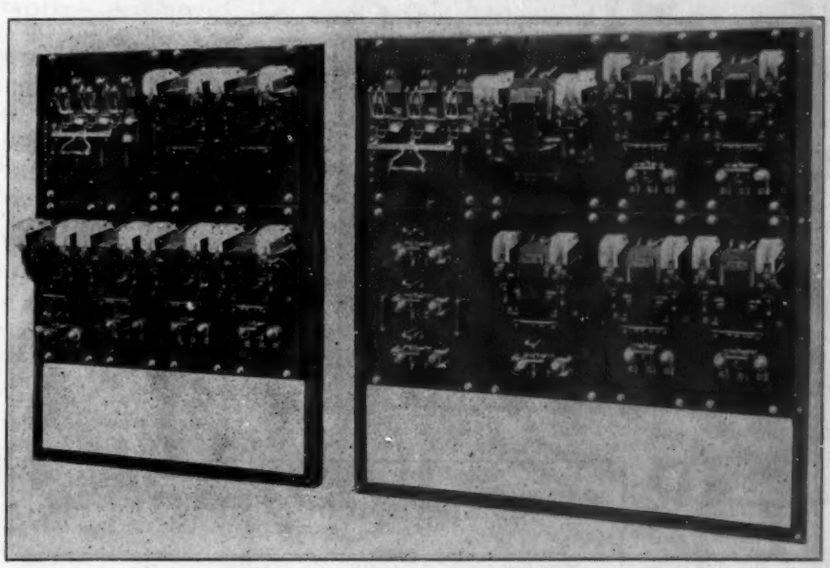

FIG. 11—CONTROL PANELS FOR ELECTRICALLY OPERATED SHOVEL

Shovels of capacities ranging from 60 to 100 tons are equipped with three motors, one for hoisting, one for the swinging and one for the thrust motion. Except on the smaller machines, all motors are controlled by full automatic controllers. On the smaller machines, the thrust motion has a drum controller.

Fig. 11 shows the controller panels for a 100-ton shovel. The main hoist motor is equipped with a non-reversible, automatic self-starter, which in turn is controlled by a multiple speed master drum. This controller is provided with a number of "jamming" relays, which reinsert resistance in the rotor circuit of the motor when a certain maximum torque is reached, so that if the motor is stalled by encountering an excessively heavy obstruction in the ore bank, the torque is automatically increased up to the maximum torque which the machine can stand. This avoids the stalling of the motor with the resistance short-circuited, which would result in the opening of the circuit breaker and the loss of power. The hoist motor is non-reversible, because there is always a sufficient load on the motor to overhaul it and to lower the bucket of the machine when the brakes are lifted and the power supply to the motor is cut off.

The swinging motion is controlled by a full reverse automatic self-starting controller, also provided with a master drum controller which permits of running at any speed. The use of current-limit relays has proved particularly advantageous in this instance, because the inertia of the boom of the shovel is quite high, and therefore it would be quite possible for the operator to accelerate too fast and to lift the shovel off the track, if no current-limit relays were provided for.

This is still more important in case of the dragline, the boom of which has a still greater inertia on account of its extreme length. In other respects the dragline operation is the same as that of the shovel, except that it has no thrust motion, the bucket being operated only by the manipulation of the hoisting machine. The thrust motion of the shovel is also controlled by a reverse controller with a few steps. In this case it is designed so that the motor speed is about inversely proportional to the torque, and, therefore, the motor is run with sufficient permanent resistance in the secondary circuit so that its speed torque curve with the controller in the maximum speed position is nearly a straight line, and the motor exerts the maximum torque when stalled. In this way it is possible always to have the bucket follow the uneven curvature of the bottom of the pit, when the hoisting machine is operated, without the danger of wrecking the machinery by exerting undue stresses on the thrust or hoist motion.

The diagram, Fig. 12, shows the power consumption of an electric shovel equipped with automatic controllers. A second shovel, of German make, having the same bucket capacity, weight and ampere capacity, was also tested. This we shall call the

Presented at the recent Pittsburgh meeting of the American Institute of Electrical Engineers.

"German" shovel, while the first shovel with automatic controllers is of American make, and we call it the "American" shovel. The tests were made on high grade iron ore in the Swedish iron mines in Lapland, and the results obtained are shown in the accompanying table.

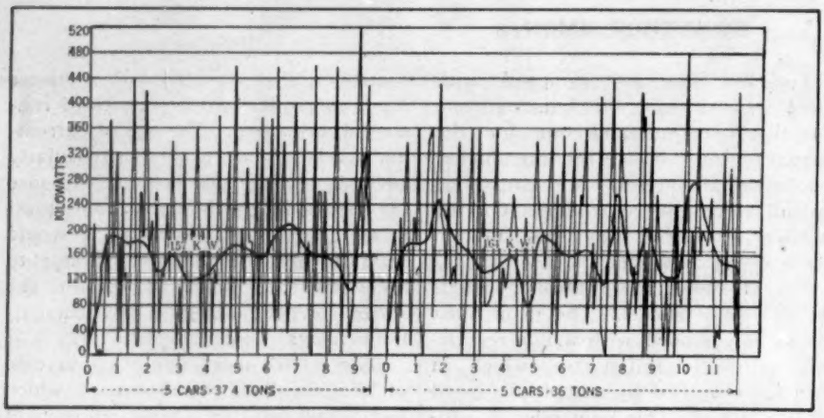


FIG. 12—CURRENT CONSUMPTION OF AUTOMATIC SHOVEL

It will be noticed that, while the maximum current peaks of the automatic shovel are higher, the shovel handled nearly twice the amount of material in a given time as was handled by the non-automatic shovel, and the power consumption per cubic yard of material handled is considerably less on the automatic shovel. If the cost of power, depreciation, interest, labor and other items, were added, it would be found that the operation of the automatic shovel is considerably cheaper than the operation of the non-automatic shovel, and that in this instance, and in a good many others, the increased cost of the more expensive installation more than pays for itself within the first year.

*Controllers for Pumps*

An important machine for steel mills and mine service is the electrically driven pump. When installed in a mine the pump controller has to be designed along the same lines as the controller for mine fans, and special provision has to be made for automatic re-starting after failure and subsequent restoration of the current supply. In some instances it is possible to have the pump started by hand operation under no-load conditions. In this case, the operator will close the inlet and outlet valves of the pump before it is started. All references here are primarily to centrifugal pumps.

Under the conditions outlined above, the pump requires only a very low starting torque and, therefore, it is very frequently possible to employ a squirrel-cage motor with compensator type starter. Under some special conditions the pump may be started even with a very low torque without manipulation of the inlet and outlet valves, and at the same time, it may be desirable to use an automatic controller, thereby doing away with the necessity of a constant attendant.

In recent years, automatic compensator type starters have been adopted and have proved to be quite successful. It has been found that such starters may be operated either with current limit or time-limit relays. In controlling the acceleration, the current-limit relay has the advantage of keeping the current peaks always within predetermined limits irrespective of the time it takes the motor to accelerate, and irrespective of any possible variations in the starting torque. On the other hand, if for any reason the starting torque required should increase appreciably, the current relay might not permit the controller to apply full voltage to the motor terminals and, therefore, the motor would always run on the low-voltage tap of the starter, and both the motor and the starter might ultimately burn out.

This danger is enhanced by the fact that the current of the motor changes only slightly during the first part of the accelerating period and therefore the current relay has to act on very small changes of current; in other words, has to be very sensitive. This extreme sensitiveness cannot be always maintained under ordinary operating conditions, and with only disinterested supervision it seems more desirable to use the time-limit relay acceleration for such controllers, despite some inherent disadvantages which such controllers undoubtedly have. If the starting torque required of the motor is liable to vary, the current which it takes with the time-limit relay also varies. This is the main objection to the time-limit relay acceleration; but, on the other hand, as long as the relay operates at all, it is not possible for the motor to run indefinitely on the starting tap of the starting transformers, but after a certain time, which normally should be sufficient to bring the motor up to proper speed, it will be brought to the full speed point, and the transformers are cut out, thereby eliminating the danger of burn-out due to low voltage.

On the other hand, if the motor should not start at the first controller tap, it would start when it is thrown on a higher tap or on the full voltage. This may not be always the best thing for the mechanical parts of the machinery, but with proper mechanical design, it would in no event be so disastrous as the stalling of the motor and of subsequent burning out, due to the inability to start at low voltage, as in the case of current-limit acceleration.

*Belt Conveyor Control*

While we are dealing with the handling of raw materials and the operations in the mines, we wish to call attention to a very interesting problem involving semi-automatic or automatic controllers for an entire series of motors; this is the motor drive of a line or several lines of belt conveyors. In cases where a great many belts are driven by individual motors, it is desirable to prevent an accumulation of material on any one of these belts, due to the shut-down of its corresponding motor. It is, therefore, necessary to interlock the controllers for the various belts in such a manner that in case of stoppage of any motor all preceding belts also come to a

## Comparison of Electric Shovels in Sweden

| | German. | American. |
|---|---|---|
| Maximum peak, kilowatts.... | 390 — 380 | 520 — 480 |
| Next four peaks, kilowatts... | 370 — 340 | 460 — 420 |
| Amount of excavation, tons.. | 36.5 — 36.5 | 37.4 — 36 |
| Average load, kilowatts..... | 105.4 — 105.4 | 157 — 164 |
| Time to load 5 cars, minutes. | 20 — 22.2 | 9½ — 11¼ |
| Kilowatt-hour, minutes..... | 35.1 — 38.6 | 24.8 — 30.8 |
| Kilowatt-hour, per ton..... | 0.96 — 1.06 | 0.662 — 0.855 |

standstill, stopping the delivery of material to the belt in trouble, so that the motors can only be started in the reverse rotation in which the material is handled by the various belts.

A number of such installations have recently been completed for coal and ore belts. In one notable installation, covering some 30 belts, the interlocking has been accomplished by means of centrifugal governors, which are driven by the countershafts on the belts, and which when standing still open any interlocking circuit which is in circuit with the preceding motor. In another instance, all belts, crushers, etc., belonging to the system are controlled by compensator type starters, the no-voltage releases of which are interlocked so as to get the results desired. This shows to what extent automatic controllers can be adapted to the steel mill industry to supersede inefficient labor.

*Controllers for Ore Bridges*

The electric drive of the coal and ore bridge has received a great deal of attention of late years. This problem is important because most of the raw material is transported by water on the Great Lakes, and since the shipping season is comparatively short, it is desirable to load and discharge vessels as quickly as possible to get the highest rate of return from them. The loading and unloading equipments therefore have been designed to enable more rapid handling of material than is found anywhere else in the world.

One of the most important installations in the blast furnace plant is the skip hoist, on the operation of which depends the smooth running of the furnace. Skip hoists are also used in mines, cement plants, and so on.

*Skip Hoist Controllers*

Fig. 13 shows a diagram of a balanced automatic skip hoist in a cement plant. These hoists are designed for a maximum pull on each rope of approximately 11,000 kilograms (25,000 pounds). These rope pulls are balanced by the weight of the descending skip on the other side, so that at the time of starting, the unbalanced rope pull which the motor has to handle is approximately 7,000 kilograms (15,500 pounds). Each hoist is designed to handle 7,200 kilograms (16,000 pounds) of stone per trip. The skip weighs 5,400 kilograms (12,000 pounds) and the incline is 67.5 degrees from the horizontal. The hoists are equipped with a 125-horsepower, 550-volt, 60-cycle, three-phase motor, continuous duty, and the gear is designed to give a maximum rope speed of 200 feet per minute. The actual hoisting distance is 139 feet, and each hoist is designed for a capacity of 400 tons per hour. The operation of the hoist is entirely automatic, the starting being initiated by the loaded car, and a solenoid brake is mounted on the motor shaft to bring the hoist to rest. The hoist stops always within 3 inches of the same point. By slightly overloading the skip, each hoist has handled 4,700 tons of stone in 10 hours.

*Controlling Mine Hoists*

Another very important application is the electric drive to mine hoists. Where very large powers have to be handled, special arrangements are usually made, such as the installation of an Ilgner system. For smaller powers the slip-ring type motor is quite suitable, with a series-relay type reversible hoist controller.

The satisfactory operation of the series relays may best be judged by the fact that in a certain installation the current peak at starting never exceeds 80 amperes, the maximum current which is allowed by the power company. Some figures relating to this hoist may be of interest. The hoist was guaranteed to require not in excess of 90 amperes in handling 3,200 kilograms (7,000 pounds) when operating balanced or unbalanced; the maximum rope pull at the drum not to exceed 3,700 kilograms (8,200 pounds) in the latter case. The current input specified is measured on the primary side of the transformer, with a primary voltage of 2,080 volts, at 60 cycles. The calculations showed that, on the guaranteed condition of load, the maximum current peak should not exceed 80 amperes which checks up exactly with the graphic curve. The motor is 200 horsepower, 440 volts, 60 cycles. The controller, in addition to the switches handling the motor circuits, is equipped with a high-tension type magnet switch which cuts off the current of the transformer whenever the motor stands still, so as to avoid the primary losses of the transformer.

The most important motor application in the steel mill is the main drive for the rolling mill. A great deal of discussion has taken place during the last 10 years regarding the most advisable arrangement for this installation. European practice today uses two-high mills driven by reversing direct current motors, which are supplied from a motor-generator set with flywheels, and which are controlled according to the variable voltage system. On the other hand, in this country, operating men have preferred a three-high mill driven by a constant speed motor running always in the same direction. This enables the use of high-voltage alternating current motors directly supplied from the central power station.

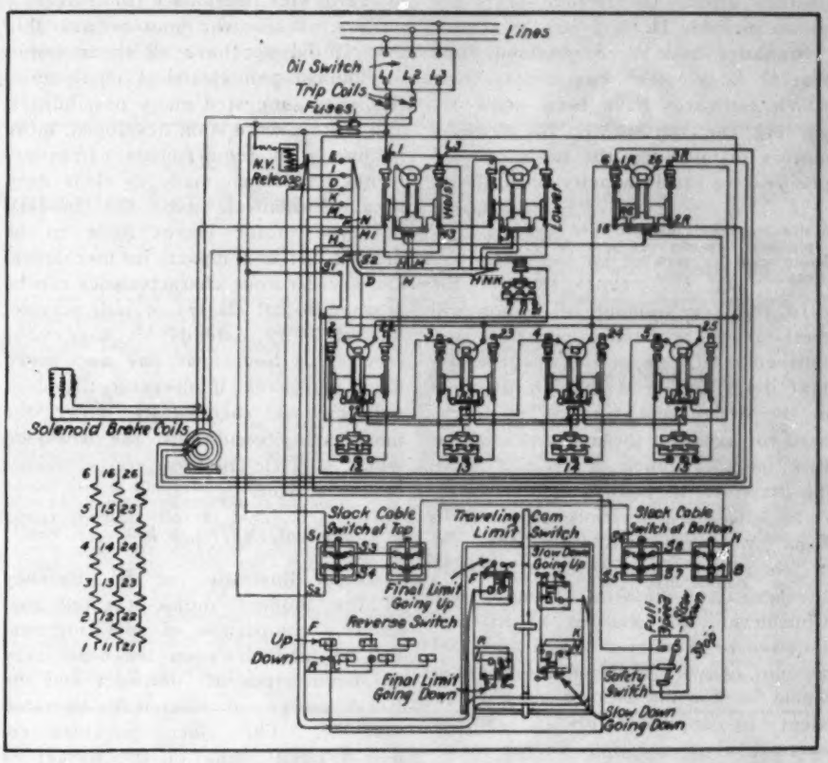


FIG. 13—CONNECTION DIAGRAM FOR ALTERNATING CURRENT SKIP HOIST SHOWING LIMIT SWITCHES AND RELAYS

# Buying Power for the Rolling Mill

## Central Power Station, Motor Manufacturer, and Steel Plant Should Co-operate to Secure the Best Results from Installations

BY BRENT WILEY AND WILFRED SYKES

THE IRON and steel industry ranks first in almost every particular, including values, tonnage and usefulness of product. Particular reference will be given in this article to those points which relate to steel plant operation. Government statistics covering the power consumed in the country's principal industries during the last 10 years are shown in Table II.

Statistics have been obtained from several large steel companies, from which estimates have been made regarding the horsepower of auxiliary motors installed on the basis of tons per year of steel capacity, as follows:

| | Horsepower. |
|---|---|
| Motor capacity installed per ton of pig iron capacity per year..... | 0.0064 |
| Motor capacity installed per ton steel capacity per year..... | 0.0136 |

In the development of economical methods of producing pig iron and finished steel, one of the most important items has been the improvement in the design and type of machinery used for handling the iron and steel, as this includes much work and time. To illustrate, it requires approximately eight lifts and six hauls of materials from the appearance of the ore at the blast furnace department to the arrival of the steel at ingot rolls. Considering the amount of material required to produce a ton of steel, the amount of work required for handling would be, for the average plant, equivalent to approximately a 750-foot vertical lift of one ton. In the earlier days this work was accomplished by steam and much of the handling was done by laborers. As a whole, the methods were slow and very expensive. The most important features necessary for the improvement of the systems of handling materials, also the design, types and capacity of machines used, are more convenient and economical transmission of power and more adaptable driving units, as regards compactness of design, general mechanical fitness, greater range of speed and torque characteristics, and convenience, ease and certainty of control, including automatic features.

One of the most apparent advantages of motor drive is the ease of power transmission, especially to traveling motors. The transmission of steam or water power to isolated devices is complicated, expensive, troublesome, and for traveling motion, in many cases almost impossible and seldom practical; while electric cable can be readily installed in unobtrusive places to lead to any part of the mill or yards for stationary or traveling motors. While the motors available at first did not have all the required mechanical and electrical characteristics, they suggested many possibilities, and motors were soon developed, more in line with requirements. Improvements have been made as their need became manifest, until the modern mill-type motor leaves little to be desired. It is compact; its mechanical and speed torque characteristics can be adapted to all classes of mill service; its reliability extends to continuous service, 24 hours per day and seven days per week if necessary; and it will operate successfully under the most trying conditions, the worst to which electric motors are subjected in any service.

### *Great Difference in Costs*

As an illustration of the efficiency of the modern motor-operated machine, a comparison of operating cost will be made between the older type of steam-driven ore unloader and the latest design of electrically-operated machine. The older machines required hand filling of the bucket in the hold of the boat, the bucket then being lifted and conveyed to the stock pile through the bridge structure by a steam-operated rope haulage system. The cost per ton in handling ore from boat to yard was approximately 15 cents. The motor-operated unloaders of today are of much greater capacity, the cycles of operation are greatly reduced in time, delays have been practically eliminated, and the use of hand power has been reduced to a minimum. With the latest methods, the handling of the ore from dock to stock yard costs approximately 2 cents per ton. Thus the oll-over efficiency of the present methods means a saving of from 75 to 80 per cent as compared to the cost of operation of the older systems. To a large extent, motor drive has made this possible. Motors are applied to the following machinery in a modern iron works:

In the blast furnace department, to ore unloader (if plant is situated on water front), car dumper (if plant is situated inland), rule haulage, larry car, ore bridge, skip hoist, pig casting machine, pumps, fans, gas washers, cranes, conveyors and machine tools. In the open hearth department, to electric locomotive, ladle crane, charging machine, furnace door lift, gas valve control, ingot stripper, and crushing and grinding machinery. In the rolling mill department, to soaking pit crane, ingot buggy, mill table (rolls and lift motion), screw-down of rolls, ingot manipulator of table, cranes, finishing machines, such as saw-shears, straightening machines, and to pumps, fans, blowers, machine tools, etc.

It would not be practical to formulate any specific rules for estimating the power requirements for a plant, as each department should be analyzed separately and a summary then made of the whole. In a blast furnace plant the average load will be equal to approximately one-third to one-fourth the total capacity of the motors installed, with peak loads of 200 to 300 per cent of the average load. The power conditions for the auxiliary motors only are somewhat different in steel mills, the average load being from one-fourth to one-seventh the total horsepower of motors installed and the peak loads ranging from 135 to 185 per cent of the average. A majority of the auxiliary motors operate intermittently and the total amount of power required for the various machines is comparatively small. In the case of mills using motor drive on the main rolls this auxiliary load will add from 5 to 10 per cent to the power required for the actual rolling of the steel.

The use of motors for driving the main rolls has increased in a remarkable degree since 1905. An interesting curve has been prepared showing the total capacity and rate of installation and in order to show more definitely the general developments, the motor capacity at the plant of the Indiana Steel Co., Gary, Ind., which is of exceptionally large magnitude for an individual installation, has been deducted from the total capacity

From a paper read at the ninth annual convention of the Association of Iron & Steel Electrical Engineers, Detroit, Sept. 8 to 11, 1915.

shown. The total number of motor driven mills shown by this curve is 200, and the totol capacity of motors driving main rolls is 275,000 horsepower, units below 300 horsepower not being included. The list of electrically operated plants includes reversing blooming mills, billet and bar mills, plate mills, sheet mills, rod mills, merchant mills, wire mills, structural mills, and rail mills.

Information regarding some of the product rolled, power required and load conditions for various types of mills are given in Table III. There are, however, a great many arrangements of mills, schedules of rolling and various other factors to consider, which makes it necessary to analyze each individual mill very thoroughly before definite recommendations can be given regarding the proper characteristics of the driving unit.

maximum tonnage will depend upon the number of pieces that it is possible to have in the rolls simultaneously, and this is a factor that must be carefully considered, as there are always periods when the mill is worked for a short time at its maximum capacity.

The type of mill and the method of drive employed determine, to a very great extent, the characteristics of the electrical equipment. If the motor is geared to the mill in some way, such as spur gearing, chain drive, rope or belt drive, considerably higher speeds can be used than if the motor is direct connected. Only the small finishing mills run at speeds which correspond to the ordinary commercial speeds of the motor, the heavier mills having such slow speeds that special machines are required for direct drive. The direct coupling of the

necessary to make a careful analysis of the operating conditions and the power requirements.

The application of the data of rolling mill conditions requires considerable investigation. It is, first of all, necessary to determine the power requirements of each individual pass, and when more than one pass is in the mill simultaneously, to superimpose the various loads in accordance with the probable operating conditions. This depends upon the number of gangs of men on the mill and the method of handling the material. After allowance is made for the friction of the mill, the average load and also the peaks that should be carried by the flywheel can be determined. When this has been worked out in relation to the type of control to be used, the size of the motor and flywheel can be ascertained.

Table I

## Steel Companies Using Purchased Power

| Name of Steel Co.—Location. | Name of Power Co.—Location. | Date of contract. | Approximate kilowatt hours per yr. | Character of power supply cycles. | Characteristics of driven machines. |
|---|---|---|---|---|---|
| Seneca Iron & Steel Co., Buffalo, N. Y. | Niag., L'kp't & Ont. Pr. Co., Niagara Falls. | 1908 | 10,000,000 | 25 | Sh. ml. & aux. mo. |
| Lackawanna Steel Co., Buffalo, N. Y. | Niag., L'kp't & Ont. Pr. Co., Niagara Falls. | 1907 | 40,000,000 | 25 | Aux. motors |
| Halcomb Steel Co., Syracuse, N. Y. | Syracuse Lighting Co., Syracuse. | 1905 | 1,220,000 | 60 | Mill & aux. mo. |
| Apollo Steel Co., Apollo, Pa. | West. Penn. Rwy. Co. | 1912 | 5,000,000 | 60 | Sh. ml. & aux. mo. |
| Ontario Iron & Steel Co., Welland, Ont. | ——— | 1908 | 4,000,000 | 25 | Mill & aux. mo. |
| Carnegie Painters Mills, Pittsburgh, Pa. | Allegheny County Light Co., Pittsburgh. | 1911 | 10,000,000 | 60 | Mill & aux. mo. |
| United Steel Co., Canton, O. | Canton Light & Power Co., Canton, O. | 1912 | 10,000,000 | 60 | Mill & aux. mo. |
| Kansas City Bolt & Nut Co., Kans. City, Mo. | Kansas City Elec. Light Co., Kans. City. | 1913 | 3,000,000 | 25 | Mill & aux. mo. |
| Steel Co. of Canada, Hamilton, Ont. | Domin. Pr. Transm. Co., DeGew Fls., Ont. | 1912 | 12,000,000 | 66 | Mill & aux. mo. |
| Massillon R. M. Co., Massillon, O. | Massillon Gas. & Elec. Co., Massillon, O. | 1912 | 1,000,000 | 60 | Mill & aux. mo. |
| Central Steel Co., Massillon, O. | Massillon Gas. & Elec. Co., Massillon, O. | 1914 | 7,000,000 | 60 | Mill & aux. mo. |
| Alton Steel Co., Alton, Ill. | Alton Gas & Elec. Co., Alton, Ill. | 1913 | 10,000,000 | 60 | Mill & aux. mo. |
| Union R. M. Co., Cleveland, O. | Cleveland Elec. Illum. Co., Cleveland. | 1913 | 3,000,000 | 60 | Mill & aux. mo. |
| Minnesota Steel Co., Duluth, Minn. | Great Northern Power Co. | 1912 | ..... | 25 | Tie in arrangem't |
| St. Louis Screw Co., St. Louis, Mo. | Union Elec. Lgt. & Pr. Co., St. Louis. | 1913 | 5,000,000 | 25 | Mill & aux. mo. |
| Simonds Mfg. Co., Lockport, N. Y. | Lockport Lt. Ht. & Pr. Co., Niagara Falls. | 1910 | 4,000,000 | 25 | Mill & aux. mo. |
| Morris Bailey Steel Co., Wilson Sta., Pa. | Allegheny County Light Co., Pittsburgh. | 1910 | 3,000,000 | 60 | Mill & aux. mo. |
| Crucible Steel Co., Syracuse, N. Y. | Syracuse Light Co., Syracuse, N. Y. | 1911 | 1,200,000 | 60 | Mill & aux. mo. |
| Amer. Steel & Wire Co., Worcester, Mass. | Connecticut R. Tran. Co. | .... | 4,600,000 | 60 | Elec. fur. au. mo. |
| Upson Nut Co., Cleveland, O. | Cleveland Elec. Illum. Co., Cleveland. | 1913 | 4,000,000 | 60 | Elec. fur. au. mo. |
| Amer. Steel & Wire Co., Several Plants. | ——— | .... | 8,000,000 | 60 | ..... |
| Empire R. M. Co., Cleveland, O. | Cleveland Elec. Illum. Co., Cleveland. | 1915 | 5,000,000 | 60 | Sh. ml. & aux. mo. |
| Western Reserve St. Co., Warren, O. | Trumbull Public Service Co., Warren, O. | 1914 | 5,000,000 | 60 | Sh. ml. & aux. mo. |
| Standard Tin Plate Co., Canonsburg, Pa. | West. Penn. Rwy. Co. | 1915 | 4,000,000 | 60 | Sh. ml. & aux. mo. |

A number of factors determine the size of the motors and the characteristics required, the principal of which are as follows:

The volume of metal displaced when rolling, which is the principal item in determining the amount of work done by the mill. Metal is displaced whenever the area is reduced or the shape is changed. The means by which metal is displaced. If the displacement is in the direction of rolling, the power required is considerably less than if the metal is displaced sideways or by distortion of the shape. The relation between the average and maximum tonnage which determines the average and maximum loads on the motor. All other things being equal, the tonnage rolled will depend upon the time required to roll each piece and the weight and number of pieces rolled per hour. The

motor avoids the space required for the gearing and also reduces the maintenance. The use of some form of gearing reduces the first cost and sometimes gives a flexibility to the drive that would not be present under the direct connected machine. The performance of the higher speed machines is also better than that of the low speed direct connected motors. The different combinations possible and the requirements of the various mills, make it necessary to carefully study each installation before deciding what type of drive should be installed.

The size of fly wheel chosen and the type of control affect appreciably the operation of the motor. It is by a correct combination of the motor, flywheel and control, that the most satisfactory installations are made. To determine the right combination, it is

With specific information given on these several points, it is possible to closely estimate the proper size, speed, control and all other features of the apparatus. The recommendations in the majority of cases, are based on wide experience in solving rolling mill problems, the building of a large number of units, and investigation of field conditions by means of tests. This practical means of procedure insures the selection of apparatus best suited to meet the mill requirements.

Motor drive provides the most practical method of generating and utilizing cheap power. In steel plants this is obtained by using blast furnace gas engines, connected to generators, or by burning the gas under boilers and using the steam to drive turbo-generators. A third method is to use the exhaust steam from existing non-condensing engines in turbine

units. The average load on rolling mill driving units varies from 25 to 75 per cent and the average load will not be more than 30 to 40 per cent of the normal rating of the driving unit. The several varying loads in a large steel plant are equalized when power is furnished from a central power station, giving 75 to 80 per cent average load. It will be found in the majority of existing steam engine driven mills that the steam consumption of a central power plant with turbine units of 5,000 kilowatts or larger capacity will be not more than 50 per cent of that required by the engine drives, inclusive of the reversing mill equipment.

Motor drive provides an economical method of distributing power. Electric power can be transmitted several miles at a practical voltage with less than 5 per cent loss, with a reasonable expense for line construction. The transmission of steam is attended with losses several times this amount, except within very limited areas. No loss occurs when power is not being used.

Table II

## Electric Power in Various Industries

| | Total primary horse power | | Horse power in electric motor | | Per cent electric to total | | Per cent central station power to electric total | |
|---|---|---|---|---|---|---|---|---|
| | 1904. | 1914. | 1904. | 1914. | 1904. | 1914. | 1904. | 1914. |
| Iron and steel..... | 2,422,577 | 4,120,000 | 306,868 | 1,540,000 | 12.7 | 37.5 | 2.3 | 12 |
| Lum. and tim..... | 1,886,959 | 3,500,000 | 33,517 | 250,000 | 1.8 | 10.0 | 42.2 | 50 |
| Textile ..... | 1,426,106 | 2,350,000 | 108,584 | 740,000 | 7.6 | 31.4 | 23.1 | 46 |
| Pulp and paper..... | 1,093,708 | 1,520,000 | 31,604 | 275,000 | 2.9 | 18.0 | 8.7 | 35 |

Motor drive greatly reduces maintenance and general repair charges. Data has been secured from a motor operated mill and from a steam engine driven mill, operating conditions being as similar as possible. The cost of operation of the motor unit is said to be less than that of the steam unit, including the items of labor and materials, repairs, supplies and attendance, excluding cost of power or steam. The total yearly cost of operation of a certain 1,500-horsepower motor driving sheet mill is claimed to be $1,200; the total yearly operating cost of a simple steam engine driving the same sheet mill is $3,850. In general it is found that the motor cost for such items as these will average 25 to 35 per cent of the cost for steam engine drive.

Motor drive insures great reliability of operation, as there is but little wear and breakage of the driving unit and mill parts, including rolls, couplings, pinions, etc., owing to uniform torque as given by a motor and the time element required by the change of magnetic conditions in the motor during wide changes of load, the excessive shocks on the mill are avoided. The motor is capable of a very uniform rate of acceleration under heavy load conditions; and excessive overload protection can easily be supplied. All of these favorable conditions mean lessened cost of operation and reliable service.

### *Has Good Speed Characteristics*

The use of motor drive insures a greater average output and a better quality of product, due to better speed characteristics of driving unit, and more economical use of power. Indicating instruments, located in the operator's pulpit, give him a ready means of checking and assist in developing the most economical rolling schedule, eliminating excessive peaks and working more closely to an average load condition. The friction losses can be easily checked and considerable power saved by keeping them as low as possible. The friction losses average from 15 to 30 per cent of the capacity of the driving unit, and may easily exceed this amount if the mill and parts are not kept in proper condition, especially in regard to alignment. As an example, a test on a 1,500-horsepower motor, driving a sheet mill, showed the average load to be 75 per cent, the friction load, as calculated from monthly power records, being 43 per cent of the total power consumed. An increase of 10 per cent of friction load on this mill means a 4.3 per cent increase in the total power used.

Motor drive is easily applied to the mill; its control is simple and easy to operate; it affords increased economy of operation of a mill subject to frequent idle periods and where speed adjustment is required; and provides means of utilizing favorable propositions from the large central station companies, the principal advantages being as follows:

Reduction of the first cost of installation. This capital can be invested to better advantage in the direct manufacture of steel. Elimination of the power plant, the management of the steel company being enabled to devote a greater portion of their attention to the direct manufacture of steel. Availability and reliability of central station power the stations being operated by skilled engineers and equipped with spare units. The electric drive for a steel plant, consisting of one 40-inch reversing blooming mill, one 24-inch bar mill, one 72-inch plate mill, and one sheet jobbing mill, it is claimed, can be installed for approximately one-half of the cost of complete steam drive, including the boiler plant and the necessary electric station for the auxiliary motors.

In addition to the power economy of the large generating units installed in central stations, the types of machines may usually be such that better operating conditions can be obtained by a more complete utilization of steam through a greater range of temperature. The possibility of carrying the whole load during light load periods on one or two machines which are run at practically full load means that the power is generated at a steam consumption corresponding to about full load on the turbine instead of being generated in the large number of units running at very light load, when the steam consumption may be 50 to 100 per cent higher. The fixed charges of central stations are naturally less as they have the advantage of the diversity factor. The summation of the peak loads of the apparatus connected to the station is considerably larger than the actual peak load on the station, in some cases being as high as three or four times as much. In stations supplying all industrial load a diversity factor of two is not uncommon and might be expected in the large station. In other words, to carry the load if individual plants were used would require in a certain case, say 100,000 horsepower, the same load could be carried by the central station with an installation of 50,000 horsepower. It is, therefore, clear both in regard to operating expenses and overhead charges, central station is in a better position than the individual plant.

Table I gives a partial list of the steel companies using purchased electric power. The 24 plants included use approximately 160,000,000 kilowatts per year, which is approximately 12 per cent of the total electric power used in the steel industry.

Some of the principal reasons why the steel companies are developing rather slowly as customers of the central stations are as follows:

The difficulty of establishing the different rolling conditions that must be met, inclusive of sections to be

rolled, tonnages, etc., the limitations of conclusive data as presented by the steel companies regarding operating cost of their steam-driven mills, the indefiniteness of the power companies' proposals, and the skepticism of steel plants regarding the question of continuity of service and regulation of the power furnished by the power company. It is evident that the general advantages of electric drive are becoming well established, but impetus will be given the general question of electrification, when the advantages of central station power are more definitely realized by the steel industry.

It has already been stated that the electrical manufacturing companies act as consulting engineers in the majority of cases and often recommend and are responsible for the characteristics of the driving equipment furnished, the steel companies merely outlining the rolling conditions.

In making this analysis, the motor manufacturer is in possession of data which enables him to outline the exact power requirements, and from test data obtained in the field and general knowledge of steel mill work, he can also calculate a comparison of operation of motor drive versus steam engine drive. This data is necessary for the central station company in order to figure their proposed power rate on a definite basis.

The steel company should be responsible for outlining the details of the schedule of rolling. The motor manufacturer is willing to assume the responsibility for specifying the characteristics of driving unit and control; and as motor control and fly wheel effect of the system should be estimated together, he should include this in his recommendations. This procedure assists in getting proper capacity of driving unit, and gives the best load conditions. The central station should provide a proposal as free from indefinite features as possible, and in such form that the customer can estimate what his power cost will be per ton of metal rolled. The power company should be responsible for the continuity of service and the regulation of power supply. Steel companies often express a strong desire to have either the central station company or the motor manufacturer guarantee that their rolling will not cost more than a certain amount for power. While the motor manufacturer is willing to outline, both to the steel company and the central station, the amount of power required and the load conditions that will exist, qualifying this information according to the rolling conditions outlined by customer, he cannot assume any such responsibility as mentioned above because he has no jurisdiction over the operation of the plant. While he might be able to demonstrate for a short period that the metal could be rolled at a certain number of kilowatt hours per ton, the average may be much above this amount, due to poor average operating conditions. The central station company is in about the same position, but should be willing to present a rate schedule which will figure a definite cost per ton of metal rolled under certain outlined conditions. The responsibility for rolling the steel at or below the desired cost per ton for power is thus divided and in a practical and co-operative way, working no hardships on any party. The motor manufacturer acts as a helpful agent to the steel company and central station. This leads to a proper study of the operating conditions by the steel company; and it has been shown repeatedly that such investigations always lead to improvements which bring additional profits. The ease by which such an investigation can be made with electric drive is a factor that cannot be over-rated. The readiness with which power costs can be accurately distributed, compared with steam drive, leads to the elimination of waste and the keeping of a constant check on operation which invariably leads to more economical results.

Table III

## Mill, Material, Product, and Power Conditions

| Kind of mill. | Size of stock. | Size of finished product. | No. of passes. | Revolutions per minute. | Aver. load in kilowatts | Peak load in kilowatts. | Kilowatt-hours per ton. | Connection of motor to mill. | No. of stands. |
|---|---|---|---|---|---|---|---|---|---|
| 40-in. blooming, reversing | 19 x 21-in., 7,000 lb. | 6 x 7-in. | 15 | 90 | 1,610 | 2,000 | 23 | Direct | 1 |
| 24-in. 3-high bar | 6 x 7-in., 750 lb. | 7 x ¾-in. | 16 | 60 | 700 | 1,800 | 14 | Rope or gear | 1 |
| 72-in. plate | 3 x 30 x 48-in. 1,200 lb. | 62-in. No. 12 g. | 17 | 51 | 600 | 1,800 | 33 | Rope | 1 |
| Sheet mill | 30 x 7 x ¾-in. | 0.01 to 0.09-in. | 5½ | 30 | 950 | 1,600 | 105 | Rope and gear | 16 |
| Rod mill | 1¾ x 1¾-in. x 30-ft. | No. 5 Rod | 16 | Cont. mill | 1,635 | 2,700 | 102 | Direct bevel | 16 |
| 8-in. Merchant | 1¾ x 1¾-in. | 0.405-in. to 0.485 ft. diameter | 6 | Cont. mill | 485 | 700 | 54 | Geared belted Geared | 6 |

For turning and boring babbitt the point of the tool should be a very acute angle. The top clearance should be quite pronounced.

## New System of Tuyeres

A cupola tuyerage system with double water-cooling of the tuyere section, water-cooled bosh plates, and blast chambers so arranged as to baffle the blast before it enters the furnace, has been invented by Francis J. Zippler, Pittsburgh, and will be furnished by the J. W. Paxson Co., Philadelphia. In the Zippler design, the bosh plates are made in hollow section so as to form a series of water jackets. The principal water jacket surrounding the tuyeres is built in segments designed to be easily removable in case of breakage of any portion. This practice also permits the use of solid sections between the tuyere blocks. These sections may be either integral with or separate from the tuyere blocks and the water jacket segments, and relieve the latter from the weight of the furnace walls above. The tuyere section is further cooled by a surrounding water jacket band. To baffle the hot blast before it enters the furnace, the supply pipes are staggered with the tuyere openings, the blast striking the outer face of the tuyere water jacket and being sharply deflected. Each tuyere draws its supply of air from an annular chamber thus fed by the supply pipes. The furnace also is provided with tapered inserts between the tuyere blocks, to prevent molten metal from running back into the tuyeres and supply pipes.

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George C. Wilson, affiliated with the main office of the Independent Pneumatic Tool Co., Chicago, has been appointed manager of that company's branch at Atlanta, Ga., succeeding F. H. Charbono, who has been transferred to Boston.

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The Kline Motor Co., Richmond, Va., advises that it does not intend to manufacture high explosive shells or any other form of ammunition. The Kline company manufactures automobiles and expects to adhere strictly to its regular line of work.

# Exploration Work on Cuyuna Range

## Importance of Magnetic Examination of Property Should Not Be Underestimated—Use Churn Drills for Sample Work

BY P. W. DONOVAN

EXPLORATION and drilling on the Cuyuna present several features peculiarly characteristic of the range and a brief consideration of these may be of interest. A preliminary magnetic examination has an important bearing on the location of holes, in spite of the statement frequently made by disappointed explorers that the magnetic lines have nothing to do with the presence of ore. Year by year, the results of exploration, especially on the south range, have increasingly shown the importance and desirability of careful and detailed work of this kind, and while the presence of a magnetic line is not an invariable indication of an ore body, the fact remains that the lines of maximum attraction constitute the great guide to exploration on this range.

The first step, then, in the exploration of a normal Cuyuna property is a magnetic survey to determine the course of the maximum attraction upon it. Or if there is no attraction on it, the course of the trend of the maximum as indicated by its position at the nearest point on each side. This magnetic data will naturally be correlated with drilling or mining information on neighboring properties where it is available.

### *Method of Exploration*

The method of exploration commonly followed opens with the running of a base line across the property, following as closely as possible the course of the maximum attraction. From this, holes are located in cross sections at right angles to and at regular intervals along the strike. The normal foot wall member of the district is the magnetic slate and the normal dip is to the southeast. For these reasons the ore is usually to be expected on the south side of the maximum attraction, the distance varying more or less from place to place. The dip varies from 55 degrees southeast to vertical, 70 degrees probably being the average for the south range, and somewhat flatter for the north range. In a few cases dips to the northwest have been found. The first hole on a cross section would be started from 50 to 150 feet southeast of the maximum attraction and angling towards it. This distance and whether the angle should be 60 or 70 degrees would depend on the depth of surface expected. The position in which this first hole cut the formation would determine the location of the other holes on the same cross section. For the normal south range ore body three holes to a cross section will block it out in sufficient detail. In fact under uniform conditions alternate sections of three and two holes can be used. On account of the greater width of north range ore bodies a larger number of holes to a cross section may be required.

Along the strike 300 feet is the common interval between cross sections, making five cross sections to a 40. Assuming the extension of the ore body to be the full width of the 40 the plan of exploration outlined above would block it out in a manner to permit an accurate estimate with the drilling of 12 to 15 holes. The average depth of these holes would be about 260 feet, making a total of about 3,400 feet per 40.

The depth of surface varies from a minimum of 14 feet in the northwest part of township 46, range 29, to a little over 300 feet at some points on the east end of the range in Aitkin county. Over the productive part of the south range the average may be said to be about 100 feet and that for the north range about 80 feet.

The kinds of surface vary considerably from place to place on the range but roughly they may be grouped into three general classes: all sand; gravel, hardpan, boulders and sand; and clay. The last is the least common, though it is found in the northern part of township 47, range 26 in Aitkin county. These various characteristics are of special interest in their bearing on shaft sinking or stripping. The all sand surface while offering serious difficulties for shaft sinking, is ideal for handling by steam shovel or hydraulic methods where other conditions make stripping possible. Illustrative of the three methods of opening in this type of surface are the Barrows shaft, on the south range; the Armour No. 1 steam shovel pit on the north range, and the Hill Crest hydraulic pit. The Wilcox, an expeditiously sunk drop timber shaft, on the south range, went through 91 feet of surface, the upper 65 feet being gravel and the last 26 feet clay. In general it can be said that at no place on the range has been found any such succession of boulders as are sometimes encountered on the Mesabi range, and the difficulties arising from such a condition are not to be contended with here either in drilling or stripping.

On account of the variety in surface conditions, the preservation of surface samples in drilling is of first importance. The conditions they indicate may have much to do with the choice of the method of opening to be used and a little attention to this matter during the first drilling will largely obviate the necessity of special surface test holes when opening is under consideration. In the same connection, all possible data as to water level should be secured while drilling is in progress, as this information, correlated with the observation of the surface samples, will throw much light on the conditions to be expected in shaft sinking.

### *Drilling Practice*

The outfit used is the light churn drill equipment with separate diamond drill attachment as developed on the Mesabi range. Its adaptation to angle hole drilling, particularly for surface or churn drill work has been largely a local development. In this respect the chief feature of interest is the use of two auxiliary legs with the tripod. They are set at the angle of the hole to be drilled and tied to the front of the tripod. A movable cross piece slides up and down on them and takes the weight of the casing as well as holding it to the proper angle. This feature saves much time in setting up, strengthens the tripod for heavy surface work and greatly facilitates the drilling operation.

The crews themselves, originally recruited from the Mesabi range and experienced in vertical hole drilling, have shown commendable ability in adapting themselves to conditions here. In the early days on the range, 1905 and 1906, much difficulty was encountered in driving the 3-inch casing through surface in angle holes, and not infrequently it would be hopelessly stuck at depths of less than 100 feet. In more recent practice many angle holes have been driven through as much as 250 feet of surface and an average of 15 feet or over per shift maintained for the whole distance.

There has been considerable discus-

(*Continued on page* 552b.)

A paper read at the 20th annual meeting of the Lake Superior Mining Institute, Crosby, Minn., Sept. 6 to 9, 1915. The author is local representative, E. J. Longyear Co., Brainerd, Minn.

# Taking No Chances With Electricity

## Modern Safety Practice Demands That the Electrical Engineer Permit No Margin of Risk in Industrial Installations

BY W. GREENWOOD

THE hazard from electrical equipment is not at the present time fully appreciated and guarded against. Considering opportunities, the ratio of serious and fatal accidents through the generation and distribution of electric current is greater than through all operations connected with any other industrial pursuit. Every installation of electrical equipment is made with a presumed knowledge that every law for the control of electrical energy is known; and yet, while the general principles embodied in these laws may be known, it is possible that the necessity for their rigorous application is underestimated.

Since the discovery that electricity could be utilized to serve mankind, effort has been directed towards handling it safely; next, towards handling it economically. Is it not possible that, through the demands of business competition, the importance of handling it safely has been, in too large a measure, made subordinate to the importance of handling it economically? One of the hardest conditions the safety engineer faces today is that spirit of resentment, inherent, inborn or ingrown, commonly felt toward anyone who reveals an oversight or error that should have been seen and corrected before it was pointed out. Aversion to controversy over a subject involving deeper knowledge than many of us possess prevents the safety engineer from making vigorous effort to change the opinion of the electrical engineer. It might be said that accident prevention is accomplished by safety engineers through a combination consisting of 20 parts work and 80 parts diplomacy. To overcome this spirit of resentment requires a judicious application of diplomacy.

While the safety engineer may not understand all the intricacies of detail in making the electric current perform most of its various offices, he does know the generally recognized fundamental principles that govern the handling of it. It is not hard for most of us to understand the method adopted for constructing standard tables of weights and measures, and the purpose for so doing, but it may be hard to establish the relation existing between the various properties of this phantom something, called electricity, which at times seems to mockingly ignore the rights of animal or vegetable creations to existence.

### *Bluffing Their Way Out*

Frequently we call the attention of electrical engineers, responsible for installations, to their insufficient provision for the prevention of accidents; upon which they produce pencil and tablet, and construct diagrams which, reinforced by citations of well-known laws, confound our contentions, making us feel that the term insufficiency applied to our intellects only. Yet, notwithstanding this proper establishment of conditions, made in accordance with proper theoretical requirements, accidents do occur and they usually are ascribed to the intermeddling of Providence, but careful exhaustive investigation usually reveals that faulty or incomplete installation was responsible. By incomplete installation, we mean that which is not perfect enough to insure safety under any and all conditions we are able to foresee. A favorite argument to justify incomplete methods of installation is improbability of simultaneous failure of two or more factors, each of which should be reliable under normal conditions. Always the investigator is told the accident could not have happened but for failure of equipment; it was through unnecessary exposure or ignorance, or it was not thought anyone would disregard well-known rules of precaution. It is the old, old story, and why should we question the infallibility of systems laid down in accordance with proven facts? And yet, after all, it is only by maintenance of a perfect sequence of conditions, each dependent on another, that infallibility can be assured.

I know the advocate of radical measures is bound to be unpopular where competition is keen and maximum results in efficiency are sought from minimum expenditure, but I firmly believe the maximum of efficiency in production can be obtained only through installations that are, so far as accident prevention is concerned, fool-proof in fact as well as in theory. Many installations are made that are not even accompanied by faith in their worth and these, like prayer without faith, avail nothing. Consider the waste from replacing makeshifts with other makeshifts; add to this the waste from accidents to equipment as well as to persons, which could have been avoided, and it will be seen that from the efficiency point of view, the positively safe construction has the call.

When all has been summed up it amounts to this: Only a perfect installation of an entire system, embracing its various units, guarantees immunity from accidents. An imperfection in a unit of a system, where the units are interconnected, lessens the value of the whole, which is verified by the axiom, the whole is no stronger than its weakest part. An absolutely perfect installation of electrical equipment never was made and I am going to say unequivocally, one that is perfect so far as the avoidance of accidents is concerned, never will be made. By this I mean one that is proof against accidental grounds and short circuits. We have to contend with broken insulators, abrasion of insulation, interference by ignorant persons, injury from storms and floods and an additional long list of causes.

Safety knows what is wanted and we know what it wants, so we are going to say to the electrical engineer, "why wait for an ultimatum from long-suffering humanity?" In the campaign for prevention of accidents we are not going to accept such excuses for not safeguarding installations as, "no one is supposed to do that which apparently is wrong". Not all the blame is going to be placed on the man who forgot, the man who could not see or the man who did not care. Anyhow, none of these suffer alone the consequences of their own failure.

The comparative number of accidents from different causes should not be determined solely by the factor of hazard in a single operation, but by this factor combined with the factor of opportunity. I will attempt to make this statement more plain by hypothetical illustration and will use switches for the subject. If two switches are operated under like conditions and one is operated two times where the other is operated but once,

From a paper read at the Association of Iron and Steel Electrical Engineers ninth annual convention, Detroit, Sept. 8 to 11, 1915.

the one operated twice as often as the other will have twice as many accidents. The hazard factors from operation are equal, while from increase of opportunity the number in one case is twice as high as in the other. Again, if the switches are operated an equal number of times under unlike conditions, one having twice as many accidents as the other, then the hazard of operation in one case is twice as high as in the other. Since opportunities are limited by operations we cannot hope to make any reduction here, but we can hope to reduce the hazard of operation. To do so, compliance must be made with the following demands:

Every insulator must be made as durable as human ingenuity can devise and must be tested for perfection. Every filament lamp must have the live parts so insulated that a current cannot be established through the dead parts, and they, too, must be tested for perfect insulation. Every switch must be protected so that access cannot be had to any part of it while the current is not broken. Every conductor must be carried in conduit underground, or in metal encasement, except where conditions will not permit. Every installation of apparatus must be so protected, according to its requirements, by barrier, insulation, isolation, ground wires, current breakers, or some other device or method that will prevent escape of current through any medium not intended for its passage.

Despite the fact that specific rules and instructions are laid down in the code adopted by the National Association of Fire Underwriters and in other codes prepared by some of the larger manufacturing corporations, for grounding neutrals of three-wire systems, dead parts, secondaries, etc., there still is a lack of agreement among electrical men as to the importance of making these grounds, which in numerous instances results in neglect to make proper compliance with the code; or compliance is made in such a half-hearted way that the amount of good secured is offset by increased liability in normally safe sections. Safeguarding electrical equipment by grounding parts differs from mechanically safeguarding machinery, in that one is visible and the eye can determine its completeness, while frequently no part of the other is visible to the eye and its completeness cannot always be determined, even by the ordinary methods of testing. There is no class of accidents so cruel as those that occur through misplaced confidence or through a belief that every duty has been performed by others as they should have been. Yet this class constitutes a high percentage of the whole.

The campaign for safety has caused a large outlay of money and the results so far obtained have fully justified the outlay. While this is true, the work so far done is not wholly satisfying. It has merely shown possibilities which must be realized; and since we have taken the slogan, "Safety First", for our watchword, our actions should be in keeping with our professions. Furthermore, quoting President Wilson, "Nothing in progression can rest on its orginal plan."

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The effect of copper upon steel for roofing tin is described in a recent booklet issued by the American Sheet & Tin Plate Co., Pittsburgh.

COL. BOPE DIRECTING RIFLE PRACTICE

## Drills Citizen Soldiers

Col. Henry P. Bope, vice president of the Carnegie Steel Co., Pittsburgh, recently returned from the rifle ranges at Mt. Gretna, Pa., where he goes each year as major of ordnance attached to the second brigade of the Pennsylvania national guard. The squad of citizen soldiers under his command won all the first prizes offered during the encampment of the second brigade, an unusual honor, which reflects credit upon the man who directed the practice. The accompanying photograph shows Col. Bope in a service uniform at Mt. Gretna. He always has been interested in the work of military organizations in Pennsylvania and is said to be the only Pittsburgh steel company official who devotes a part of his time each year to the training of militiamen.

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## Safety First

Two men were working on a machine, driven by gasoline power, of which the engine was cooled by a fan. One stationed himself at the starting switch, the other at the fan to tighten it. The switch was closed at an unexpected moment and the fan suddenly revolved with great power. One of those men now carries an artificial hand as a result of the carelessness of his fellow workmen. The lesson is just another of care and caution which would have prevented an expert mechanic and a fine fellow from going through life a cripple.

Safety, Security, Success. The first is essential to the second and third.

Pass the safety habit around, but take plenty on your own plate.

Two workmen were injured on the same day in the same department in one shop by stepping on protruding nails. One accident was caused by the nails being covered by straw by a workman who did not think "Safety First".

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Wentworth Institute, Huntington avenue and Ruggles street, Boston, Mass., has issued a new catalog containing a description of two new courses which have been added to the Wentworth curriculum. One of these, a one year, day trade course in forging, hardening and tempering, is intended to give proper training to young men who wish to obtain a thorough knowledge of both hand and machine forging practice. The second new course is intended for students who expect to enter some one of the manufacturing industries, but who wish to spend a year in preparatory work.

# Business News of Nation's Capital

## Strong Sentiment in Favor of Amending the Tariff—National Defence Plans—Iron Ore Rate Inquiry

Washington, Sept. 14.—Unusually important legislation is in anticipation for the sixty-fourth congress, which convenes in regular session on Monday, Dec. 6. International conditions may compel the President to call a special session before them, but this contingency will be avoided if it is at all practical.

Lively times appear to be ahead for the next session. This is indicated in numerous ways. Revision of the tariff, the merchant marine, national defense, international matters, re-enactment of the war tax and other revenue raising measures are all under discussion as being prepared for legislative action.

No official announcement has been made that the tariff will be revised, and heretofore President Wilson has denoted strongly that he did not propose to have the Underwood-Simmons law changed in any respect. On one occasion last spring when asked if the tariff were to be revised, he replied negatively and asserted that it was working "absolutely satisfactorily". Whether he has changed his mind in view of conditions which have developed since is a matter of conjecture only. It is a fact, however, that much pressure is being brought to bear to rebuild the tariff in several respects, not only to give it more protective features, but also to derive added revenue through it. The depleted condition of the treasury, which the administration ascribes to conditions growing out of the war, has apparently made it certain that the war tax act will be re-enacted as soon as congress meets. Some supporters of the administration assert that this will not be sufficient to relieve the embarrassed condition of the treasury, and that higher tariff duties are needed, as well as the substitution of duties where none are provided at present. Moreover, there is constantly growing a sentiment within the ranks of the Democratic party that the tariff had failed even before the war was begun, and that higher protection should not only have been afforded originally, but will be mandatory after the war to prevent tremendous dumping of goods from countries now at war which, when peace is restored, are expected to exert every effort to renew to capacity industrial activity and to distribute their output throughout the world, regardless at first of the matter of profits or cost. The department of commerce has issued a statement on the effect of war on United States trade, saying that prices will continue high in this country and that lack of skilled labor and other elements will make it impossible for countries now at war to invade the fields of United States industries. The account is held to represent only a view which is confined solely to an assumption that cannot be depended upon as being well founded. It is contended, on the other hand, that the industries will find plenty of workmen and will be driven at top speed in an effort to regain lost trade. The most ordinary caution, it is maintained by those asking for a revision of the tariff, calls for more protection as soon as it possibly can be given. Under the plea of deriving more revenue, this could be done by the administration without conceding that the tariff act was a failure.

Two influential Democratic members of the house who were in Washington recently declared in favor of a revision of the tariff at the coming session of congress to the extent of re-enacting the free sugar schedule. These members were Robert N. Page, of North Carolina, and Carter Glass, of Virginia. Both were of the opinion that a duty of at least 1 cent a pound should be placed on sugar. Free sugar, which, unless other provision is made, will become effective April 30, 1916, will mean an annual revenue loss of $50,000,000. Mr. Page also would have a duty of 15 cents a pound placed on wool. He has estimated that a 1-cent-a-pound duty on sugar and 15-cents-a-pound on wool will mean approximately $80,000,000 to the treasury and would likewise favor a duty on coffee and tea. American textile manufacturers have come to Washington and declared protective tariffs on coal tar products and dyestuffs will furnish practically the only relief from embarrassments to them. It is claimed in some quarters that not only will better protection be afforded to the foregoing products, but that the entire free list of the Underwood-Simmons law will be almost if not entirely abolished. Possibly the belief that the tariff will be revised is based on false hopes, but indications are stronger today that it will be changed than at any time before. Steel interests would do well to plead for more protection. Another proposal to increase revenue is said to involve the enactment of an inheritance tax. There are Democrats who will vote against re-enactment of the war tax as well as against the passing of an inheritance tax.

The question of national defense is going to be an extremely vital issue the coming season. The administration is working on an extensive program in this direction. While there still will be opponents to increasing the national defense, despite developments in the European war, it is a certainty that there are many who formerly were opposed to either a strong army or navy who are now in favor of both. The administration itself appears to be much more enthusiastic over an ample national defense than in the past.

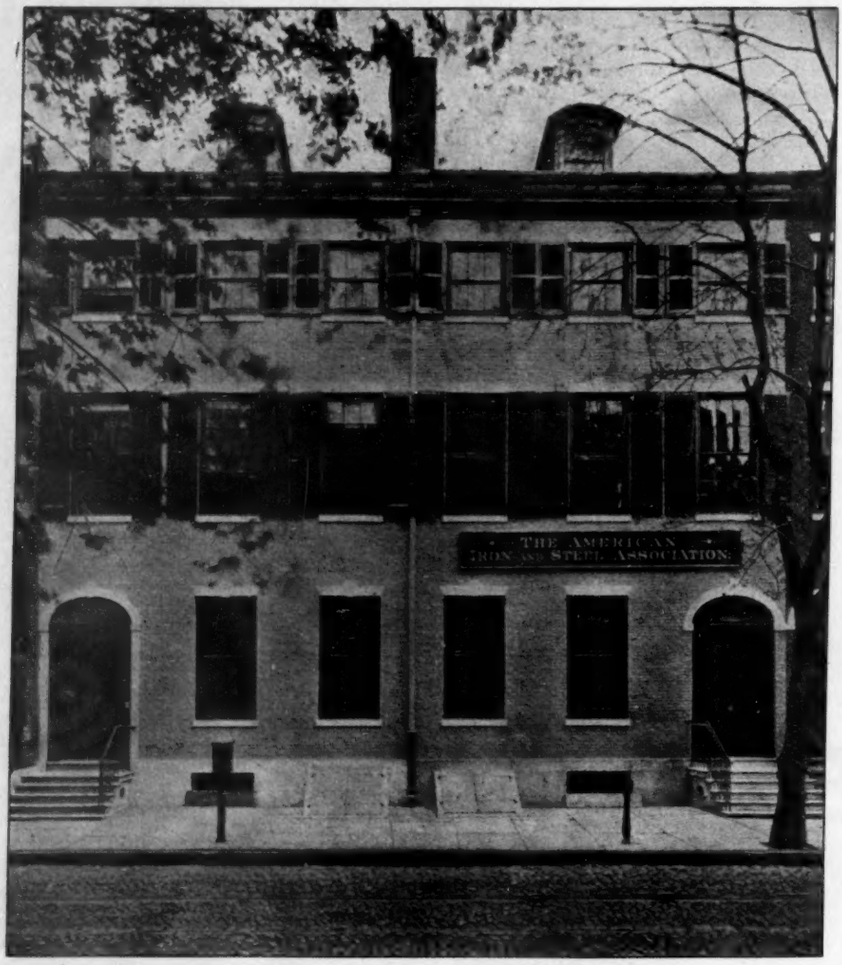
Following the action of the war department in the early part of August, the navy department has compiled information obtained from manufacturers as to their output of the materials which the navy might need in case of an emergency. That action is in line with the development of campaign plans under consideration by the department. It is expected that the work will require months, in fact, years, before it is finally completed. The inquiry that the navy department is pursuing pertains primarily to the manufacture or output of structural materials used in the building of ships, rope, various articles of boat and shop equipment, provisions, raw materials for the manufacture of clothing and colliers that may be available for transporting supplies to the fleet. The inquiries are recorded and replies thereto regarded as confidential and will be changed from time to time as conditions in the manufacturing districts warrant. Assistant Secretary Roosevelt, in explaining the action of the navy department, said, among other things, that the facilities of various manufacturers for turning out munitions have been so increased that it was desired to know what the increased output might be.

### Iron Ore Inquiry

Washington, Sept. 14.—Hearing by the interstate commerce commission of evidence in connection with its investigation dealing with the rates on iron ore from Lake Erie ports to points in Ohio, West Virginia and

western Pennsylvania and Kentucky is expected to require one week or more. It will begin on Oct. 18 in Pittsburgh and will be presided over by Commissioner James S. Harlan.

The commission will first submit in evidence, through its examiners, a summary of data compiled by it from reports made by the railroads in reply to questions sent to them by the commission. The plaintiffs who are now protesting against the rate of 88 cents per ton to Wheeling, W. Va., are supposed to follow with evidence, but in view of the fact that the 88-cent rate is an increase, the old rate having been 60 cents, the complainants may contend that the burden of proof to justify the higher rate is on the railroads and in that event they would be forced to take the initiative in this direction. The Wheeling case will be followed by evidence from plaintiffs objecting to the 88-cent rate to Pittsburgh, after which comes other evidence, among which is that relating to the complaint against the rate of 56 cents per ton to the Mahoning and Shenango valleys, situated in Ohio and in Pennsylvania, respectively.




HOME FOR MANY YEARS OF AMERICAN IRON AND STEEL ASSOCIATION

Following his refusal to restore the wage scale which was reduced July 1, Secretary of the Navy Daniels has directed that a special wage board investigate wages paid to machinists in private plants with a view to having similar wages paid machinists at the Washington navy yard. The board will visit the plants of the Bethlehem Steel Co., South Bethlehem, Pa., and the Midvale Steel Co., Midvale, Pa., and report immediately thereafter. It is thought the investigation will show the private concerns are paying higher wages than the government. The law provides that the government navy yards and arsenals shall pay wages similar to those paid in private plants in the vicinity. It

**Furnace Satisfactory.**—The electric steel melting furnace installed at the plant of the Niagara Electric Steel Corporation, North Tonawanda, N. Y., by the Snyder Electric Furnace Co., Chicago, has been in operation for some time and has been turned over to the purchasers. The Snyder Furnace company designs, builds, installs and starts its furnaces, turning them over to the purchaser in operating condition under a definite guarantee.

# Historic Building

**Will Be Deserted by American Iron and Steel Institute**

No. 261 South Fourth street, Philadelphia, which long has held a place in the minds of iron and steel men of the United States, almost akin to reverence for the practical and valuable work in the interests of the industry, that has been done within its unpretentious walls, is about to yield to the progress of time.

The unpretentious three-story brick structure, originally a residence in a historic section of the city of Philadelphia, which time out of mind has served as the headquarters of the American Iron and Steel Association and later as the statistical bureau of the American Iron and Steel Institute, is to be supplanted by the modern and ornate 36-story skyscraper of the Adams Express Co. The removal of the statistical department from Philadelphia and its consolidation with the general headquarters of the American Iron and Steel Institute at New York, will take place around Oct. 1. Final arrangements now are being made for this transfer.

The passing of the old Fourth street quarters, recalls its career, rich in traditions and reminiscences of the days when the iron and steel industry of the country was in its infancy. It was amid its plain and simple surroundings that the late James M. Swank for 40 years directed the destinies of the American Iron and Steel Association, supervised the completion of the compilation of the admirable system of statistics of the iron and steel industry which still obtains and vigorously labored for the principle of the protective tariff for American manufacturers. Eminent statesmen, great manufacturers and leaders of men made it the mecca of their steps, there to gain inspiration and practical data from the kindly, lovable man who had consecrated his life to the development of an idea —the protection of home industry.

Mr. Swank became secretary of the association on Jan. 1, 1873, and one year later the offices were removed to the Fourth street location, where they have remained ever since. Since 1885 until his retirement, Jan. 1, 1913, Mr. Swank also served as general manager. When the American Iron and Steel Institute was formed in 1910, it gradually succeeded the American Iron and Steel association and the headquarters were removed to New York but the statistical work continued to be done in Philadelphia.

# Iron and Steel Electrical Men Meet

## Safety First and Purchased Power Form Main Topics of Ninth Annual Convention at Detroit—Brilliant Banquet at Statler

THE use of central station electrical power by steel mills, and the problem of safeguarding high tension electrical installations in industrial plants, were questions which evoked interesting discussions at the ninth annual convention of the Association of Iron and Steel Electrical Engineers, at the Hotel Statler, Detroit, Sept. 8 to 11. Several papers read at the convention brought out strikingly the significance of purchased power in the iron and steel industry. Many of these who discussed the papers emphasized the contention that more thorough cooperation between steel manufacturers, builders of electric motors, and power companies, would not only simplify the puzzling problems of minimum rates and required capacity for peak loads, but would also increase the efficiency of future installations.

The presence of several well-known safety engineers lent interest to the discussion of methods for preventing electrical injuries. It was pointed out that an unduly large proportion of such injuries occur, not among ignorant foreign laborers, but among trained men in charge of apparatus, who, to use the picturesque term of one speaker, constantly "flirt with death".

The first day's morning session was devoted to the election of officers, the following being chosen for the coming year: W. T. Snyder, electrical superintendent, National Tube Co., McKeesport, Pa., president; F. D. Egan, steam and electrical engineer, Pittsburgh Crucible Steel Co., Midland, Pa., first vice president; Chas. A. Menk, superintendent electrical department, Carnegie Steel Co., Homestead Works, Munhall, Pa., second vice president; W. O. Oschmann, electrical engineer, Oliver Iron & Steel Co., Pittsburgh, secretary, and Jas. Farrington, superintendent electrical department, La Belle Iron Works, Steubenville, O., treasurer.

### *Problems of Wire Rope Users*

At the Wednesday afternoon session, R. F. Patterson, electrical engineer, Pressed Steel Car Co., Pittsburgh, and Western Steel Car & Foundry Co., Chicago, read an interesting paper on "Improving a Non-Condensing Power Plant by the Use of Direct Current, Mixed Pressure Turbine Equipment". Considerable discussion followed. "Wire Rope and Its Relation to Steel Making" was the title of a paper read by James F. Howe, which will be published in a later issue of *The Iron Trade Review*. In the discussion of this paper, the importance of proper lubrication of rope strands was emphasized, the heat caused by the friction of small internal wires, it was said, producing rapid deterioration. Certain paraffin oils, it was declared, are dangerous owing to an alkali constituent. Emphasis was also laid on the necessity of securing sheave wheels turned and ground absolutely true. The use of 6-strand 37-wire cables was recommended, such cables having 50 per cent of their wires protected by the outside layer, while a 6-strand, 17-wire cable has but 30 per cent of its strands similarly safeguarded. Complaints were made of the difficulty of adjusting equalizers with a double sheave, a sliding, cutting action taking place which rapidly destroys the rope. Mr. Howe advised the use of equalizer bars to overcome sheave wear, also pointing out that, should one end of the cable then be broken, only half the cable would need to be renewed. The practice of clamping cables to the sheave was criticized, on account of its tendency to produce unequal vibration in the cable, causing ultimate crystallization.

### *Discuss New Equipment*

At the Thursday morning session, which was held jointly with the American Institute of Electrical Engineers, a paper on "Recent Developments in Power Generating Apparatus" was read by P. M. Lincoln, past president of the institute. Mr. Lincoln referred to the remarkable development of the steam turbine, both in regard to efficiency of steam consumption and the size of units installed. He declared that the much higher efficiency of large turbines over moderate sizes gave the central power station an inherent advantage over the isolated plant.

"Protection and Control of Industrial Electric Power", by Dr. Charles P. Steinmetz, chief consulting engineer, General Electric Co., Schenectady, N. Y., discussed interestingly the complicated and sensitive instruments now used to safeguard power lines and installations from lightning discharges, carelessness of switchboard operators, and other accidents. The remarkable work of the multi-recorder, which in one case recorded 50 different electrical operations on one power system in 16 seconds, was explained. Dr. Steinmetz also discussed the power limiting reactance and the lightning arrester.

E. Friedlaender, past president of the association and superintendent, electrical department, Carnegie Steel Co., Edgar Thompson Works, Braddock, Pa., read a paper on "Motor Generators vs. Rotary Converters", which evoked considerable discussion. Mr. Friedlaender declared that the only advantage possessed by the rotary over the motor-generator set is in better efficiency of actual power transformation in the machine itself. This advantage, he said, might entirely disappear under certain circumstances.

At the afternoon session, K. A. Pauly, electrical engineer, General Electric Co., Schenectady, N. Y., reviewed "Some of the Latest Developments in Electrical Equipment", including the Scherbius and rotary converter systems of control, the truck type ironclad switchboard, and other recent features. The ensuing discussion developed a theory that the tendency toward the use of higher speed motors in rolling mills is increasing, as well as that toward the use of motors in blooming mills. The latter, it was declared, handle the steel gently and have the advantage of constant power as the load is increased. "Push Button Control in the Blooming Mill" was predicted for the near future. Dr. Karl George Frank, representative Siemens & Halske and Siemens Schuckert-werke, New York, reviewed "Progress in the Iron and Steel Industry and the Electric Furnace", in a paper to be published in a later issue of *The Iron Trade Review*.

In a most amusing as well as instructive discussion of "Mechanical Analogies in Electricity and Magnetism", W. S. Franklin, professor of physics, Lehigh University, Lehigh, Pa., displayed by means of ingenious mechanical models the close parallels which exist between electrical and physical phenomena.

### *Hold Annual Banquet*

Speakers at the ninth annual banquet of the association, held in the Hotel Statler ball room on Thursday evening, included Colonel Henry P. Bope, first vice president, Carnegie Steel Co.; Dr. Chas. P. Steinmetz,

chief consulting engineer, General Electric Co., Schenectady, N. Y., chairman; Gano Dunn, president, J. G. White Engineering Corporation, New York; Dr. Schuyler Skaats Wheeler, president, Crocker-Wheeler Co.; Ampere, N. J.; Paul M. Lincoln, past president, American Institute of Electrical Engineers; Prof. W. S. Franklin, Lehigh University, Lehigh, Pa., E. Friedlaender, superintendent, electrical department, Carnegie Steel Co., Edgar Thomson Works, Braddock, Pa., and J. J. Carty, president, American Institute of Electrical Engineers, New York. Mr. Dunn, as president of the United Engineering Society, urged the need of closer co-operation between all the members of the vast engineering fraternity. Dr. Wheeler gave interesting reminiscences of the early days of commercial electrical motors. Dr. Steinmetz wittily burlesqued his own earlier review of modern safety appliances. Henry Ford, president, Ford Motor Co., Detroit, was also present. After the banquet, dancing was enjoyed by the members of the association and their guests.

*Purchased Power a Live Subject*

At the Friday morning session, a paper on "The Electrification of Steel Mills and the Use of Central Station Power", by Brent Wiley, commercial engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, and Wilfred Sykes, general engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, was read by the former. This paper appears in full elsewhere in this issue. This was followed by a paper on "Purchased Power for Steel Mills", by C. S. Lankton, electrical engineer, Carnegie Steel Co., Painter Mills, S. S., Pittsburgh. Among those who discussed these papers were T. E. Tynes, electrical engineer, Lackawanna Steel Co., Lackawanna, N. Y.; J. C. Reed, electrical engineer, Pennsylvania Steel Co., Steelton Pa.; C. A. Menk, superintendent electrical department, Carnegie Steel Co., Homestead Works, Munhall, Pa.; W. T. Snyder, electrical superintendent, National Tube Co., McKeesport, Pa.; E. Chesrown, district engineer, Westinghouse Electric & Mfg. Co., Pittsburgh, and others. During the discussion it was declared that more than half of American steel plants have electrical load factor of no more than 50 per cent, and that a uniform system of reckoning the load factor is urgently needed. The decrease in the cost of electrical power, although labor and coal are growing more expensive, was ascribed to greater efficiency in details and the use of larger generating units. Several speakers expressed the view that in times of depression, power companies should share the burdens imposed on steel makers who are their customers and should make allowances possibly not specified in their contracts.

The time when central stations will cease to insist on a minimum rate in contracts with steel plants was prophesied as close at hand, several members citing cases in which the power companies now co-operate with their customers in the matter of such charges. Rates, it was said, should have no relation to the electrical capacity of the individual mill. The nature of the difficulties facing the steel plant, especially the smaller ones, generating their own power, was strongly brought out; and it seemed the general opinion that in most cases the use of central station power was the more advisable, except in the case of large plants having diversified uses for electricity so as to maintain a uniform load factor. It was even prophesied that ultimately co-operation would go so far that practically all plants would be fed by the central station, all contributing to it their quota of power in various forms, and drawing upon it as emergency dictated, without the heavy expense which at present accompanies an excess over the specified peak load. It was declared that the steel man is better employed in making steel than devoting part of his time to the consideration of power generation; but that ideal results would only be attained when plant, motor manufacturer, and power supply were in closest co-operation and the gathering of data was reduced to a definite system. The new flat rate which allows a steel plant to exceed its contracted peak load for a few minutes occasionally in cases of emergency, was also discussed.

## Ford Was There

*Members of the Association of Iron and Steel Electrical Engineers and their ladies were surprised, when they entered the banquet hall at the Hotel Statler, Detroit, on Thursday evening, Sept. 9, to behold Henry Ford, president of the Ford Motor Co., Detroit, seated at the speakers' table beside Dr. Charles P. Steinmetz.*

*Authority has it that this was the first banquet Mr. Ford ever attended in his life. He was not called upon for a speech, undoubtedly at his own request. The speakers, however, took elaborate pains, every one of them, to include a Ford story in their remarks. At each of these anecdotes, Mr. Ford attempted to look oblivious.*

*When Toastmaster Henry P. Bope indulged in witticisms at the expense of Gano Dunn and Dr. Schuyler Skaats Wheeler, Mr. Ford came out of hiding and smiled.*

*Should Investigate Gear Use*

Mr. Wiley, in an addendum to his paper figured the need of a research into the performance of gears used in the reduction of motor speeds in the operation of rolls.

"Some Electrical Applications in Steel Mill Practice", were reviewed by D. M. Petty, superintendent electrical department, Bethlehem Steel Co., South Bethlehem, Pa. Among those who discussed Mr. Petty's paper were Paul Caldwell, sales engineer, General Electric Co., Pittsburgh; Walter C. Kennedy, sales engineer, Cutler-Hammer Mfg. Co., Milwaukee, Wis.; T. E. Tynes, electrical engineer, Lackawanna Steel Co., Lackawanna, N. Y.; S. C. Coey, assistant superintendent, mechanical and electrical department, Youngstown Sheet & Tube Co., Youngstown, O.; H. S. Richardson, sales engineer, Electric Controller & Mfg. Co., Cleveland; F. J. Burd, sales engineer, Cutler-Hammer Mfg. Co., Milwaukee, Wis., and J. K. Mahaffey, district sales manager, Adams-Bagnall Electric Co., Pittsburgh. The development of remote control for steel mill machinery was strongly brought out by the author and those discussing his paper.

*Reviews Crane Development*

"The Latest Development of Electric Cranes for Steel Mills", was the subject of a paper read at the final session, by E. H. Kendall, Alliance Machine Co., Alliance, O., which will be published in a later issue of *The Iron Trade Review.* Among those who took part in the discussion of Mr. Kendall's paper were J. C. Reed, electrical engineer, Pennsylvania Steel Co., Steelton, Pa.; B. G. Beck, electrical engineer, American Sheet & Tin Plate Co., Gary, Ind.; E. H. Wentz, superintendent electrical department, National Tube Co., Lorain, O.; H. C. Cronk, chief electrician, River Furnace Co., Cleveland, and others. The possibility of doing away with the inside flange on crane truck wheels was argued, but no definite conclusion was arrived at. The lubrication of cranes was also discussed, several speakers expressing a preference for the substitution of force oil feed for grease cups throughout. It was pointed out that where employes are compelled to climb into dangerous positions to twist grease cup caps, such necessary work will inevitably be neglected.

"Installation of Electrical Equipment to Comply With the Require-

ments of Safety", a paper read by Walter Greenwood, safety engineer, Carnegie Steel Co., Ohio Works, Youngstown, O.; which is published in this issue of *The Iron Trade Review*, aroused much interest, several members contributing accounts of experiences which tended to show that carelessness, more often than ignorance, causes electrical injury in the steel mill. The need for educating the average laborer as to the dangers of the high potential apparatus with which he is surrounded, was emphasized. Other speakers pointed out the need for a larger margin of safety in installations, even if these are to be operated by men who supposedly know how to take care of themselves. The opinion was expressed that the safety departments should more actively assist the electrical departments in teaching the use of safety equipment. One speaker related cases in which men were killed and injured while in the act of adjusting the safety apparatus itself. Among those discussing Mr. Greenwood's paper were E. H. Wentz, superintendent electrical department, National Tube Co., Lorain, O.; K. H. Cederlund, superintendent electrical department, Duquesne Works, Carnegie Steel Co., Duquesne, Pa.; Adam Slater, safety inspector, Carnegie Steel Co., Pittsburgh; R. S. Huey, superintendent, Duluth plant, Universal Portland Cement Co., New Duluth, Minn., and others.

The time and place of the 1916 convention were discussed, no decision being made. Saturday morning was devoted to a visit to the plant of the Ford Motor Co., Detroit, the company furnishing conveyances for all the members through the courtesy of Mr. Ford. In the afternoon an excursion was made to a local recreation park, where outdoor sports were enjoyed.

# British Pig Iron Lower

## Blast Furnaces Being Blown Out—Advances in Finished Materials Are Checked

Office of *The Iron Trade Review*,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Sept. 4.

The continued descent of prices in the pig iron department is precipitating a serious crisis calling for a drastic remedy. There were further reductions yesterday at Birmingham, Northampton iron being obtainable at 64s ($15.36) a fall of 8s ($1.92) or 9s ($2.26) within the past few weeks. Other Midland brands have lost value in about the same ratio, and the loss of tone is still more serious, a campaign of undercutting having set in. Some of the furnaces have accumulated rather heavy stocks, which they are prepared to turn into money at substantial reductions, much to the chagrin of their competitors. On all hands, it is recognized that the only remedy is a substantial reduction of output. At least a dozen furnaces in the Midlands have been blown out, and probably another half dozen will close down within the next few weeks. Naturally, smelters having only one furnace hesitate to inflict the happy despatch upon themselves, for the benefit of their neighbors, and at present there is a disposition to allow other people to lead in the direction of self-effacement. The problem will doubtless be solved by large companies cutting off surplus furnaces. Unless this is done quickly, a very bad slump is looked for. Smelters are very sore over the ruthless squeezing by makers of finished iron, who are maintaining their own prices without difficulty.

### *Finished Iron and Steel*

So far, finished iron has not reflected the weakness of pig iron. But the upward movement has been checked, and there is an extending feeling that values have reached their limit. Common iron has apparently settled down to a figure about £11 10s ($55.20). There seems no reason to expect any advance on the £12 ($57.60) charged for best iron. Very little new business is being placed for ordinary iron bars, but this is mainly because there is practically no hope of obtaining deliveries within a reasonable time.

The reduction in the price of spelter which yesterday was quoted at £65 ($512.00) is generally welcomed, and if it continues, galvanized sheets may get a new lease of life. The present quotation for such sheets is £17 10s ($84.00), and, at this price, mills are producing at about half their capacity. A noteworthy feature is that the country warehouses have ceased ordering for the present partly because of discouragement in getting supplies, but also through an extending belief that prices will be reduced.

The steel trade continues extremely busy. It has been reported that the English and Scottish Steelmakers' Association's meeting in London a week ago made provisional arrangements for the supply of government requirements in the way of steel during the next 12 or 15 months. It is stated that a committee has been formed to allot the contracts to the respective associations, which in turn will allocate the work among their members. It is further stated that to obviate undue inflation of prices, the committee will, in consultation with the government, fix fair prices for the different classes of material. So far, the report has not been authoritatively confirmed. All the steel mills are as busy as they can be, but with prices substantially unchanged. Undoubtedly, billets have become scarcer during the past week or two. This fairly reflects the condition of scarcity on the American side, and while very good deliveries of American steel have been made, there are no new contracts, and British makers look forward to resuming their monopoly of this business. For some descriptions of material, demand is exceptionally great. In wire, for example, the great essential is to meet the enormous demand, prices having become relatively unimportant. Indeed some consumers seem ready to pay almost any premium to secure reasonably prompt delivery. Hoops are another kind of production commanding heavy premiums ranging from 12s ($2.88) to 25s ($6.00) per ton. Wire rollers are having to pay smartly for such inadequate supplies of wire rods as they are able to get from the British steel works. In Scotland, all the steel mills are overtaxed with business, mainly for war purposes.

Included in the valuable cargo of the ARABIC now lying at the bottom of the sea were consignments of £4,000 worth of steel and steel manufactures from Sheffield. Fortunately, one lot valued at £600 missed the steamer. It is well known that the LUSITANIA also carried a fair amount of steel among her cargo. There is no falling off in the demand for high-speed steel and cutting tools, and in some departments British makers are entirely unable to cope with the great demand.

In regard to cost of production the iron and steel trades have been greatly affected by the enlistment of miners. The recent returns for the coal trade show that the number of miners at work has reduced during the year by 152,000, and it is believed that practically the whole of these have joined the fighting forces.

# Cuyuna Operations Prove Surprise

## Developments on Newest Iron Range Interest Members of Mining Institute —Annual Meeting Unusually Well Attended—First-Aid Contest

"WHAT we have seen today has proved a great surprise to most of us, and I am sure I voice the sentiments of my associates here when I say that the Cuyuna can now take equal rank in the family of older ranges of the Lake Superior district."

These words of William Kelly, manager of the Penn Iron Mining Co., Vulcan, Mich., ably express the sentiment of the members of the Lake Superior Mining Institute at the close of their first inspection of the Cuyuna range. The occasion was the close of the second day's session of the institute's twentieth annual meeting. The convention opened at Ironwood, Mich., on Monday of last week.

The trip had been planned by the Gogebic Range Mining Association which had general charge of this year's meeting. A large majority of the members had never visited the newest range before. The character of the equipment at the producing mines and the extent of the development work at other places did much to brush aside the skepticism with which some of the mining men of the older ranges had regarded the Cuyuna since drilling first disclosed iron-bearing formation 12 years ago.

### *Cuyuna Development Discussed*

Anticipating the interest that would be aroused by the trip, the committee in charge had arranged for a complete series of papers discussing various phases of the Cuyuna's development. Carl Zapffe, whose series of articles in recent issues of *The Iron Trade Review* has attracted considerable attention, presented a paper on "A Survey of the Developments and Operations in the Cuyuna Iron Ore District of Minnesota"; P. W. Donovan discussed "Some Aspects of Exploration and Drilling on the Cuyuna Range", and Edward P. McCarty of the Minnesota School of Mines, described the "Hydraulic Stripping at the Rowe and Hill Crest Mines." Each paper aroused considerable discussion. Mr. Donovan's paper is reproduced in another part of this issue and the others will appear at an early date.

The interest aroused by the Cuyuna range trip, however, did not exceed that manifested in the first day's proceedings at Ironwood, Mich. The institute had not visited the Gogebic range since 1910 and the progress made there in the last five years, both in practice and in mine equipment and development, was shown by an extended automobile trip over the range and was described in papers devoted to that district.

The third and concluding day of the meeting was spent at Minneapolis, where the members visited the Minnesota School of Mines, the Minnesota state fair and were taken on a sight-seeing trip through the twin cities.

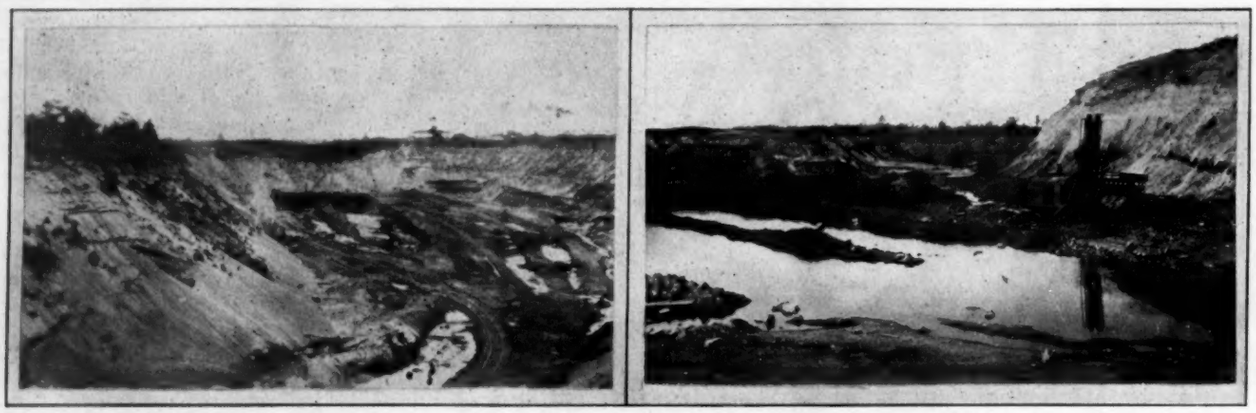
Arrangements for the meeting were in charge of a committee of which L. C. Brewer was chairman, and G. S. Barber, W. E. McRandle, R. P. Zinn, G. J. Quigley, B. W. Shove, F. B. Goodman and O. W. Johnstone, members. The finance committee comprised D. E. Sutherland, chairman, E. L. Cullen, P. S. Williams, F. B. Goodman, William Hart, W. E. McRandle, Robert King and G. S. Barber. Henry Rowe was chairman of the reception committee.

The meeting was opened formally on Monday morning at the ball park at Ironwood, when the second annual first aid contest was held. The committee on arrangements, which had general charge of the contest included P. S. Williams, chairman, Edwin Higgins, L. C. Bishop, B. Brookbank, A. E. Redner, John Mildren, A. A. Bawden and B. D. Shove.

### *First Aid Contest*

This contest, in the opinion of disinterested judges who were present, was one of the best events of that character ever held in the United States. Fourteen teams were entered compared with 12 last year. Four of the six ranges were represented. The great interest taken by mine operators in safeguarding their employes, as well as the increasing attention being given by the miners in protecting themselves and their fellow workmen from injury, was clearly demonstrated both by the increased list of entries and the attendance at the contest. Not only the institute members were present in force, but there were hundreds of citizens of Ironwood in the stands.

First place went to the Verona Mining Co. team from Palatka, Mich. The Verona company is the mining organization of Pickands, Mather & Co., on the Menominee range. The Oliver Iron Mining Co. team from the Mesabi range took second place and the Odanah Iron Co., Gogebic range, third. The other entries were the Montreal Mining Co., Castile Mining Co., Colby Iron Mining Co., Newport Mining Co., and Oliver Iron Mining Co., from the Gogebic range; Judson Mining Co., Menominee range; Republic Iron & Steel Co. and Pickands, Mather & Co., Mesabi range; two teams of the Cleveland-Cliffs Iron Co. and the Republic Iron & Steel Co., these latter from the Marquette range. Edwin Huggins of the United States



BIG OPEN PIT OF PENNINGTON MINE

ROWE MINE WHICH WAS HYDRAULICALLY STRIPPED

bureau of mines directed the contest. Dr. A. F. Knoefel, president of the American Mine Safety Association was the presiding judge. He was assisted by six other judges, all brought from the Indiana-Illinois coal fields.

The problems to be worked out by the competing teams were unknown to them when they entered the field. Each captain was handed the problem and after only two minutes of study, the teams were required to render the correct first-aid treatment. In the previous contest, the problems had been known some time in advance but this year every detail, including even the making of bandages, was required to be done on the field.

*Difficult Problems Solved*

Each problem was difficult and the readiness with which the teams solved them, elicited much favorable comment. The problems are:

*First* — Miner found at a distance of 20 feet in closely caved workings with palm of right hand lacerated and bleeding profusely. Treat and transport 20 feet to more open workings, then carry 20 feet by shoulder lift. (One man event).

*Second*—Miner found in caved drift (2½ to 3 feet high) in bad air after explosion of powder; unconscious from gases; burns on face and hands. Transport for 20 feet and administer artificial respiration by Schaefer method for one minute. Treat burns. During transportation, one of the rescuers is overcome, becoming unconscious; rescue and administer proper treatment. (Three man event).

*Third*—Miner caught by fall of rock. Left ear torn off, left shoulder dislocated, left thigh broken in upper third of leg (compound fracture) with profuse bleeding. Treat and transport 30 feet on improvised stretcher. (Team event).

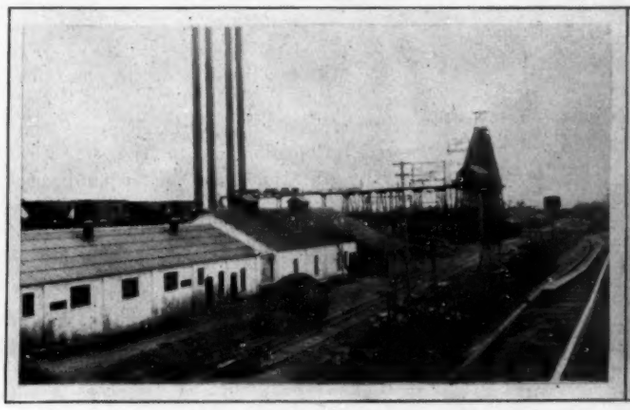
*Fourth*—Miner walks into blast; face badly lacerated over left cheek bone with profuse bleeding; severe laceration of upper part of abdomen; back of right hand lacerated, blood oozing; fracture of right knee cap; unconscious from powder gases; treat on spot (gas has cleared away) and transport 40 feet. (Team event).

The Verona Mining Co. team was taken along on the balance of the trip to Crosby, Minn., and Minneapolis, $175 having been donated for that purpose by the Gogebic Range Mining Association. The E. I. Du Pont De Nemours Powder Co. donated $50, for second place. The institute gave a like sum for third and fourth places while merchants of Ironwood donated a large prize list to be distributed among the other teams. The Oliver Iron Mining Co. and the Newport Mining Co. donated the services of their bands.

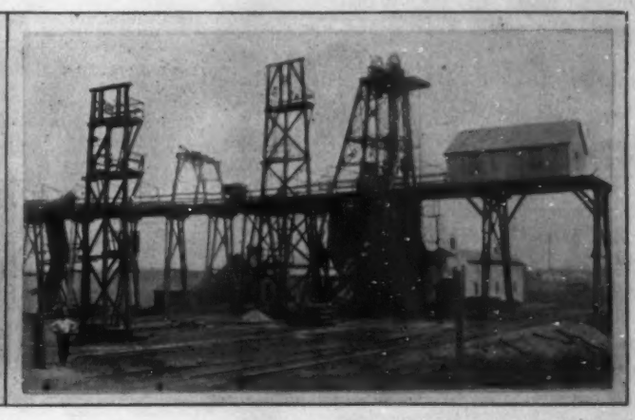
On Monday afternoon the members were taken on an extended tour of the Gogebic range. The first stop was at the *G* shaft of the Pabst mine of the Oliver Iron Mining Co. This shafthouse is a modern, steel structure, lattice columns and girders being used instead of built-up channels and I-beams. The big Newport mine was next visited. A new vertical shaft, called the Woodbury, is being sunk on this property. The permanent wooden stocking trestle at the Colby mine was next inspected. The Anvil and Palms mines of the Newport Mining Co. attracted considerable attention, owing especially to their having the first power plant on the range equipped to compensate for heat losses in long steam lines by superheating. Compound condensing hoists also were first used at this plant.

The Wakefield mine of the Wakefield Iron Co. was the last mine visited. It is the only large open pit on the Gogebic and an ore deposit of considerable size has been uncovered. The pit is about one-half mile long, 150 feet extreme width at bottom, 300 feet extreme width at the bottom of stripping, 600 feet extreme width at the top and 100 feet deep at its deepest part. Ore is also being brought up through two shafts. The Wakefield company is the first to use electricity for hoisting ore on the Gogebic range. The development and operation of this mine is discussed elsewhere in this issue of *The Iron Trade Review*. Many other mines were briefly inspected including the Sunday Lake and Mikado properties of Pickands, Mather & Co.; Eureka and Asteroid of Oglebay, Norton & Co.; Tilden, Norrie Group, Puritan, Geneva and Davis of the Oliver Iron Mining Co.; Ironton of Corrigan, McKinney & Co. and Yale of the Charcoal Iron Co. of America. Special trips were taken by some of the members to the Cary mine of Pickands, Mather & Co. and the Montreal mine of Oglebay, Norton & Co.

The first business session was held Monday evening, a number of papers being read and discussed and preliminary committees appointed. The committee on nominations included J. M. Bush, Marquette, chairman; W. J. Richards, Crystal Falls, Mich.; G. L. Woodworth, Iron River, Mich.; W. P. Chinn, Virginia, Minn., and F. W. Denton, Painesdale, Mich. The auditing committee comprised Frank B. Goodman, Hurley, Wis., chairman; J. E. Jopling, Ishpeming, Mich., and C. H. Baxter, Loretto, Mich.



ARMOUR NO. 2 MINE



HEADFRAME AT THOMPSON MINE

William Kelly, Vulcan, Mich., was appointed chairman of the resolution committee, the other members being L. C. Brewer, Ironwood, J. H. Hearding, Duluth, Charles D. Laughlin, Hancock, Mich., and J. Carroll Barr, Crosby. L. M. Hardenburg, Hurley, Wis., president of the institute, presided.

The sinking of the Woodbury shaft was described in a paper read by J. M. Broan, mining engineer of the Newport Mining Co. This shaft was sunk 1,129 feet in exactly six months, a record for the Gogebic range. Mr. Broan stated that an average of two pounds of blasting powder was used for each cubic yard of rock taken out.

Recent changes in mining methods on the Gogebic range were explained in a paper presented by O. E. Olson, O. M. Schaus and Frank Blackwell. Mr. Olson summarized these changes as follows: the use of 60-pound rails in place of 30-pound, experience having shown that fewer repairs were necessary and that there was less vibration; seven-ton skips are employed instead of five-ton; elec-

tric tractors are used underground equipped with automatic gongs and rear lights to insure greater safety; use of concrete shafts; fewer crosscuts are taken resulting in less cutting-up of the ore.

*New Type of Trestle*

G. S. Barber, superintendent of the Colby Iron Mining Co., pointed out the features of a new stockpile trestle at the Colby mine. This trestle has bents with one leg only, being guyed on each side. Mr. Barber stated that it had been found more convenient than the old type and was cheaper to build, the difference in its favor being 25 cents a lineal foot. Less trouble is encountered in loading ore with a steam shovel, and the trestle is not destroyed. Its permanency depends upon the life of the wood. The trestle is 38 feet high and is cleaned up in three cuts, less hand shoveling being required.

The development of the Wakefield mine was discussed by W. C. Hart, superintendent of the Wakefield company. His paper is presented elsewhere in this issue. The property will have an ultimate depth of 175 feet at the north end. Four shovels are at work in the pit, three working in ore and one stripping.

J. R. Reigart, assistant superintendent at Princeton, Mich., for the Cleveland-Cliffs Iron Co., explained the sinking of the Francis shaft with the aid of grouting. A strong flow of water was encountered and grouting was resorted to in order to permit further sinking of the shaft. The experiment proved both successful and economical.

The differences between iron ore mining in the Lake Superior district and sheet ground mining in the Joplin district, Missouri, was explained in a paper by Edwin Higgins. The equipment in the latter district is simple compared with the iron mines, but has given satisfactory results in mining zinc ore cheaply.

The use of a cement gun in a steel shaft and in an underground pumphouse on the Gogebic range, was explained by Stephen Royce, general engineer, Pickands, Mather & Co., Hurley, Wis. A coating of liquid cement and sand was applied under pressure. Mr. Royce stated that this coating has proved successful in withstanding extremes of temperature. In the Cary mine it is subjected to a freezing temperature while at the Sunday Lake mine, the temperature reaches 120 degrees Fahr. The coating has not been affected in either case.

The balance of the papers were read at a session at Crosby on Tuesday afternoon. "Rock Drifting in the Morris-Lloyd Mine," by J. E. Hayden, mining engineer of the Cleveland-Cliffs Iron Co., and "The Mining School of the Cleveland-Cliffs Iron Co," by C. S. Stevenson, director of the company's educational department, were read by title.

In his paper on the development and operations in the Cuyuna district, Mr. Zapffe laid emphasis on the south range which had not been visited by the institute. Despite the presence of numerous lakes, no trouble has been encountered in handling the flow of water underground. He stated that this was due to the impervious character of the lake beds. It was doubted at first whether open pits would ever be developed, but with continued exploration, large ore bodies and shallower overburdens were found resulting in extensive stripping operations. Hydraulic stripping, which is peculiar to the Cuyuna, had resulted from the character of the soil, convenient sources of water supply and easy access to dumping grounds. The problem of concentrating Cuyuna ores, he believed, was not unlike that on older ranges although in some cases it would be more difficult due to the siliceous character of the ore. The manganiferous iron ores presented a special problem that is being studied.

Mr. Zapffe also read and discussed the paper on "Some Aspects of Exploration and Drilling on the Cuyuna Range," by P. W. Donovan, Brainerd, Minn., representative of the E. J. Longyear Co. This paper is published elsewhere in this issue.

Edmund Newton of the Minnesota School of Mines discussed in detail the concentration of Cuyuna ores. He stated that the success of this process of beneficiation depended upon the form in which the silica was found, either visible or invisible.

The Cuyuna range committee which had general charge of the arrangements for the institute's visit to that range, was headed by George H. Crosby, chairman. The other members were J. Carroll Barr, G. A. Anderson, William Wearne, J. S. Lutes, E. J. Donahue, Wilbur Van Evera, Carl Zapffe, Frank Hutchinson, John A. Savage and Captain McGuire.

*Take Special Train*

A special train of flat cars was used in conducting the members over the range. The first mine visited was the Kennedy of the Rogers-Brown Ore Co., the pioneer producer of the range. The new Croft mine of the Merrimac Mining Co. was next inspected. Trips also were taken to the Armour No. 1, Armour No. 2 and Thompson mines of the Inland Steel Co. The westerly part of the Armour No. 1 was stripped this summer, the pit adjoining that of the Pennington mine of the Tod-Stambaugh Co. The combined pits of the two mines gave the visitors an excellent example idea of the extensive character of the work which is now being done on the Cuyuna range.

At the Hill Crest mine of the Hill Mines Co., hydraulic stripping is still in progress. The majority of the visitors had never witnessed stripping by this method and considerable time was devoted to a study of the work. The Rowe mine of the Pittsburgh Steel Ore Co. was the last mine inspected. It is the largest pit in the district and was hydraulically stripped. The special train was run into the pit to permit a close inspection. Later the members visited the consentrating plant which is completely equipped to handle a large tonnage of ore.

*Members Enjoy Barbecue*

The members were guests at a buffet luncheon at the new club house of the Pittsburgh Steel Ore Co. and in the evening at a barbecue at the home of George H. Crosby. In the evening a fire was built on the shores of Serpent lake and addresses were made by George H. Crosby, William Kelly, J. H. Hearding, G. L. Woodworth, and others.

At Minneapolis Wednesday morning, the institute was met by a special committee of the Minneapolis civic and commerce association and taken to the University of Minnesota. After an inspection, they were taken through the city in automobiles. The meeting concluded with a trip to the Minnesota state fair in the afternoon.

Charles E. Lawrence, superintendent of the Verona Mining Co., Palatka, Mich., was elected president of the institute, as mentioned in *The Iron Trade Review* last week. He is one of the best known mining men in the Lake Superior district. George L. Woodworth, Iron River, Frank E. Keese, Ishpeming, and Frank S. Barber, Bessemer, Mich., were elected vice presidents for a two-year term. Frank Armstrong, Vulcan, Mich., and William Wearne, Hibbing, Minn., were elected managers for two years. E. W. Hopkins, Commonwealth, Wis., and A. J. Yungbluth, Ishpeming, were re-elected treasurer and secretary, respectively.

William Conibear, Ishpeming, was elected chairman of the committee on practice for the prevention of accidents. Other members chosen were W. H. Jobe, Palatka, E. W. Walker, Maas, Mich., W. H. Harvey, Eveleth, Minn., and P. S. Williams, Ramsay, Mich. W. J. Richards, Painesdale, Mich., was elected chairman of the committee on the care and handling of hoisting ropes, the other members being A. Tancig, Hibbing, F. H. Armstrong, Vulcan, C. E. Holley, Bessemer, and C. M. Murphy, Ishpeming.

William Kelley was re-elected chairman of the committee on papers and publications, the other members being

A. M. Gaw, Duluth, F. W. McNair, Houghton, Mich., J. E. Jopling, Ishpeming, and Frank Blackwell, Ironwood. The committee on the bureau of mines includes M. M. Duncan, Ishpeming, chairman, F. W. Denton, Painesdale, and A. J. Yungbluth. The committee on biography includes J. H. Hearding, Duluth, chairman, R. A. Douglas, Ironwood, M. B. McGee, Crystal Falls, Mich., W. H. Newett, Ishpeming, and James Fisher, Houghton.

The institute received an invitation to participate in a meeting of the Mining and Metallurgical Society of America at Washington, Dec. 6. The mining interests of the country will be represented at the meeting, and methods of securing better mining laws will be discussed.

## Contracts for Furnaces

The George J. Hagan Co., Pittsburgh, recently has taken the following contracts: Twenty sheet and pair furnaces and seven annealing furnaces, designed for the Hagan new model underfeed stokers for the McKeesport Tin Plate Co., McKeesport, Pa., which is building a 20-mill addition; the Hagan company will alter and repair 22 sheet and pair furnaces now in use at McKeesport; forging furnaces for Johnston & Jennings Co., Cleveland; six sheet and pair furnaces and two double-length annealing furnaces for the Empire Rolling Mill Co., Cleveland; four double graphite kilns for the International Acheson Graphite Co., Niagara Falls, N. Y.; equipment for eight stoker furnaces for the Phillips Sheet & Tin Plate Co., Weirton, W. Va.; two tin mill sheet furnaces and two Allis continuous pair furnaces for the Wheeling Steel & Iron Co., for installation in the plant at Yorkville, O. All of the furnaces involved in the above contracts will be fitted for new model underfeed stokers of the Hagan type.

## Will Install Electric Furnace

The Thomas Davidson Mfg. Co., Montreal, has closed a contract for the installation of an electric furnace, with the Snyder Electric Furnace Co., Chicago. The furnace will melt and refine cold steel scrap, producing steel for casting into blanks for the manufacture of shells. This is the second Snyder furnace to be constructed to produce steel for making war munitions. The other furnace will be installed at Sherbrooke, by the Canadian Brakeshoe Co. In view of the stringent requirements with regard to war munitions, it is significant of the development of this useful tool.

# Heavy Exports

### And Light Imports Still Feature Foreign Commerce

Statistics collected by the bureau of foreign and domestic commerce for June show extremely heavy exports, the tonnage for that month being 355,396, compared with 246,530 tons last May and only 144,536 tons in June, 1914. For the twelve months ending with June, the exports were somewhat less than for the period ending June, 1914. The heavy exports continue to be in semi-finished material, steel bars, structural steel, sheets and plates, wire and horseshoes.

Iron ore imports for June came largely from Cuba, the tonnage brought in from that island being 77,500, while 27,848 tons were imported from Sweden.

IRON AND STEEL EXPORTS
GROSS TONS.

| | June, | | Twelve months ending June, | |
|---|---|---|---|---|
| | 1915. | 1914. | 1915. | 1914. |
| Scrap ..... | 7,280 | 2,598 | 29,830 | 69,282 |
| Pig iron ... | 22,111 | 12,894 | 130,594 | 201,995 |
| Billets, ingots, and blooms of steel ... | 48,999 | 5,126 | 220,416 | 46,926 |
| Wire rods.... | 18,137 | 12,375 | 98,438 | 56,492 |
| Steel rails... | 34,547 | 13,161 | 156,587 | 338,613 |
| Steel bars.... | 58,452 | 11,133 | 234,734 | 149,110 |
| Iron bars.... | 2,273 | 334 | 12,344 | 10,299 |
| Struc. iron and steel... | 22,812 | 15,833 | 168,624 | 296,282 |
| Hoop band and scroll..... | 2,009 | 744 | 15,097 | 11,506 |
| Sheets and plates..... | 42,660 | 26,115 | 285,409 | 372,454 |
| Tin and terne plates ..... | 7,581 | 7,183 | 80,008 | 47,276 |
| Barbed wire.. | 22,786 | 6,724 | 147,588 | 79,774 |
| All oth. wire | 28,536 | 6,898 | 147,134 | 84,316 |
| Cut nails ... | 416 | 351 | 2,643 | 4,525 |
| Wire nails... | 10,180 | 2,297 | 55,471 | 35,852 |
| All oth. nails includ. tacks | 1,266 | 226 | 5,455 | 3,184 |
| Pipes & fit'gs. | 20,119 | 17,974 | 180,082 | 240,730 |
| R. R. spikes. | 603 | 862 | 5,486 | 8,734 |
| Bolts, nuts, rivets, wash. | 1,467 | 1,336 | 13,485 | 19,826 |
| Horseshoes... | 2,956 | 39 | 13,016 | 1,216 |
| Cast radiators | 206 | 333 | 2,669 | 5,467 |
| Total .....355,396 | | 144,536 | 2,005,110 | 2,083,859 |

IRON ORE IMPORTS.

| | June, | | Twelve months ending June, | |
|---|---|---|---|---|
| | 1915. | 1914. | 1915. | 1914. |
| Spain ..... | 5,844 | 4,418 | 67,930 | 65,886 |
| Sweden ..... | 27,848 | 58,782 | 201,989 | 366,940 |
| Canada ..... | 13 | 8,782 | 40,352 | 150,181 |
| Newfoundland and Labrador ..... | | 13,215 | 17,500 | 170,540 |
| Cuba ..... | 77,500 | 75,900 | 755,901 | 1,289,663 |
| Oth. countries | 7,370 | 27,550 | 109,442 | 124,452 |
| Total .....118,575 | | 188,647 | 1,193,114 | 2,167,662 |

IRON AND STEEL IMPORTS,
GROSS TONS

| | June, | | Twelve months ending June, | |
|---|---|---|---|---|
| | 1915. | 1914. | 1915. | 1914. |
| Scrap ..... | 2,833 | 4,654 | 32,667 | 34,310 |
| Pig iron..... | 10,281 | 9,640 | 110,363 | 136,444 |
| Ingots, blooms, billets of steel | 718 | 3,560 | 24,545 | 37,603 |
| Wire rods..... | 468 | 812 | 4,807 | 11,676 |
| Rails ..... | 17,046 | 798 | 55,092 | 15,507 |
| Bar iron ..... | 664 | 1,661 | 10,284 | 21,864 |
| Structural ..... | 14 | 1,107 | 5,539 | 11,031 |
| Sheets and plates | 102 | 665 | 2,565 | 3,521 |
| Tin and terne plate ..... | 75 | 179 | 4,751 | 21,820 |
| Total ..... | 32,201 | 23,076 | 250,613 | 293,776 |

Imports of iron and steel products continue to be unimportant, but show a slight increase for June as compared with May of this year and June of last year.

The exporting of motor trucks, or commercial automobiles, continues to be very active, for in June, 1915, 2,990 were exported, valued at $8,578,802, compared with 90 in June, 1914, valued at $120,257. The exporting of passenger automobiles is also very heavy, the number for June, 1915, being 4,418, valued at $4,785,998. Last June, 62 aeroplanes were exported, valued at $283,212. The value of metal working machinery, including machine tools, exported in June, 1915, was 3,735,562, compared with $3,762,567 in May, 1915, and $1,079,810 in June, 1914. The total value of machinery exports in June, 1915, was $10,266,981, compared with $9,204,575 in June, 1914. The total value of exports of iron and steel and the manufactures of, for June, 1915, amounted to $31,757,103, compared with $18,927,958 for June, 1914.

The value of zinc exports, except ore and dross, continues to increase, the figure for June, 1915, being $2,962,144; for May, 1915, $2,481,924, and for June, 1914, $36,541. In the past twelve months, these exports have amounted to $21,243,935, compared with $406,208 for the preceeding twelve-month period.

## German Metal Company Incorporates

Considerable interest has been aroused in the metal trade by the incorporation under the laws of New York State of the American branch of Beer, Sondheimer & Co. The authorized capital is $1,000,000, which, however, an official of the company says, does not represent nearly the value of its business and properties in this country. The American branch of Beer, Sondheimer & Co., which is a German concern and one of the largest metal interests in the world, has maintained quarters in New York for some ten years past. During that time, it developed rapidly and at present it ranks among the leading spelter, lead and copper interests in this country. Its offices are located at 61 Broadway, New York. Officials of the company, which up to the present time has been managed as a branch of the business in Germany, say the taking out of the charter under New York State laws is the culmination of plans which have been under consideration for some time.

The Ferguson Steel & Iron Co., Buffalo, has enlarged its drafting room and has moved its dining hall to new quarters. The company plans to erect an extension to its plant.

# English Buy All Lathes in Sight

## Shell-Making Equipment Now Being Bought for Delivery Next Year—Bethlehem Steel Co.'s Requirements Large—Crane Market Gains Headway

BUYING of shell-making machinery continues in large proportions in the New York market. Inquiries for lathes and screw machines are both large and numerous, and those in the market run well into the thousands. There is, however, small chance of these orders being filled at the early deliveries specified. An interesting development last week was the action of the English government through direct representatives in cleaning up all the odds and ends of shell-sized lathes that could be found available for this year's delivery. While the number of machines obtained is not known, it probably was not large, as the unsold lathes of the type desired are comparatively few. Other foreign countries continue to appear as large buyers, with France as the next most important factor. Some buying in shell-making equipment now is being done for next year both for domestic and foreign account. In some cases, orders have been taken for delivery up to May. Domestic buying, apart from that dominated by war needs, remains mediocre.

The railroads are doing little buying. The Baltimore & Ohio has out a list of eight tools. The Pennsylvania is asking for some tools, punching and shearing machinery and a 40-ton gantry crane for the Altoona shops. The St. Louis & San Francisco has asked for a few tools. The most important prospective domestic business relates to the requirement of the Bethlehem Steel Co. for its latest extension at South Bethlehem, Pa. It is estimated in some quarters that the machinery to be required will run from $1,500,000 to $2,000,000. No list yet has been issued. The Lucey Mfg. Corporation, 233 Broadway, has asked bids on 100 18-inch x 7-foot screw cutting engine lathes. The bureau of supplies and accounts, Washington, D. C., will take bids Dec. 1 on a 44-inch boring mill for Boston, and on Oct. 12 for a 12-foot boring and turning mill for the Washington navy yard. The Central Heating, Lighting & Power Co., Washington, D. C., is asking for figures Nov. 17 on a complete power plant, including a 50-ton crane.

A feature of the week was the large number of cranes placed in the eastern market, these totaling probably 50, mostly of small sizes. The Wm. Cramp & Sons Ship & Engine Building Co., Philadelphia, closed for 19 5-ton wall cranes with Pawling & Harnischfeger, Milwaukee, and for seven 10-ton travelers with another concern. It also bought punching and shearing machines. The Bethlehem Steel Co. placed 11 5, 10 and 20-ton inside and yard cranes with Pawling & Harnischfeger for use at its Saucon plant. The Crocker Wheeler Co., Ampere, N. J., bought two 10-ton travelers; the Remington Arms & Ammunition Co., Bridgeport, Conn., purchased a 5-ton crane; and the Baldwin Locomotive Works, a 20-ton power house crane for Eddystone, Pa. The recent buying of the Fore River Ship Building Corporation, Fore River, Mass., comprised four 5-ton wall and four 15-ton travelers. The Seaboard Air Line has closed for a 160-ton crane. Crane inquiry for the smaller sizes is good. The Winchester Repeating Arms Co. is asking six 5-ton and hand-power cranes for New Haven; the government is inquiring for 10 and 20-ton cranes for the Alongapo Naval station, Philippine Islands, bids to be taken Oct. 12; the Kansas City Smelting & Refining Co. is inquiring for a 60-ton machine.

### *Domestic Demand Good in Pittsburgh*

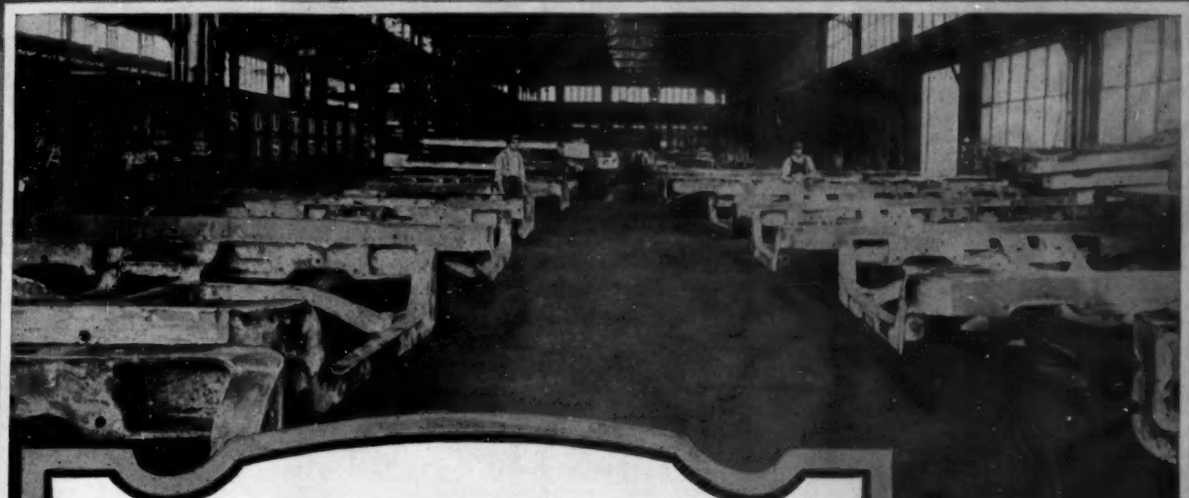
The Carnegie Steel Co., which sent out inquiries a week ago for a number of lathes, has just opened negotiations for three 5-ton electric cranes for its wheel works at McKees Rocks, Pa. The Wheeling Steel & Iron Co., Wheeling, W. Va., has practically completed plans for the installation of six additional hot mills at its plant at Yorkville, O. The International Oxygen Co., New York City, has purchased a site at Verona, Pa., and will begin the erection of the first of a number of plants in western Pennsylvania for the manufacture of hydrogen and oxygen gas. Manufacturers of wire products are increasing their capacity and most wiremakers are interested in additional wire-drawing equipment. The American Steel & Wire Co. has installed 20 new barb wire machines in its plant at Sharon and plans to increase its output further.

### *Chicago Dealers are Skeptical*

Some Chicago dealers feel that the immense demand from European and Canadian sources has somewhat spent itself and that they are not now experiencing as much pressure from these sources as formerly. Strictly domestic users are buying sparingly, finding deliveries and high prices a marked discouragement. Dealers who have been ordering continuously since the beginning of the war and who have been receiving shipments from makers each month are wondering how far they can carry this policy without danger of being left with considerable stocks on their hands when the demand ceases. Every possible means of information to guide them on this point is being sought. Manufacturers in the west are beginning to experience labor troubles, which have been a factor in New England for some weeks. These troubles are not yet acute, but inasmuch as skilled labor is difficult to obtain, the situation may become serious if demands for a shorter work day and higher wages are insisted upon.

### *Manufacturers Hesitate on Shell Contracts*

The French government has made six separate attempts in the past three weeks in Cincinnati to close orders for large amounts of shrapnel. The deliveries specified, however, cannot be met by local plants. Cincinnati manufacturers are not inclined to take shrapnel orders, as there are rumors that certain plants in Ohio which have contracts for shrapnel are not making the profit they had anticipated, and are even threatened with slight losses. It has been definitely stated by proper authorities that no shrapnel or parts of shrapnel are being made in Cincinnati at present. The majority of machine tools being made now are being sent to domestic users, and machine tool makers are dodging European orders as much as possible because of the threatened financial stringency in the warring nations. Machine tool plants



# Here's a Floor That Won't Wear Out

THE Commonwealth Steel Company, Granite City, Ill., need a floor of that kind in this plant. These immense steel castings and heavy car truck frames have to be moved about—tremendous loads are piled upon it.

¶ To get a floor that would not crush, crumble or corrugate—that would reduce truck labor to the minimum and be serviceable always—they put down an

**AYER & LORD**

## Interior Wood Block Floor

THIS SHOWS HOW THESE BLOCKS ARE LAID. THE FLOOR BECOMES IRONED OUT BY USE INTO A DENSE, SOLID, SMOOTH, UNIFORM MASS.

¶ This installation has resulted in floor efficiency of the highest order, at practically no further cost for up-keep.

¶ When properly laid, Ayer & Lord Interior Wood Block Floors increase in strength, smoothness and firmness the more use they get. These blocks become more and more compact, offering extraordinary resistance and resiliency under the extremes of weight and wear.

¶ This floor is dustless and noiseless—a low conductor of either heat or cold. It is highly sanitary and will not rot; is comfortable for employees to work on and a safeguard against accident.

¶ If you are aiming at greater efficiency in your plant investigate the possibilities of an Ayer & Lord Interior Wood Block Floor.

**Write us for new booklet "FLOORS"**

It contains further information—photographs of installations of every character. Tell us something of your floor problems—our engineering department will gladly advise and specify to suit your conditions without any obligation being incurred.

**Ayer & Lord Tie Co.**

Railway Exchange CHICAGO

CLEVELAND, OHIO
926 Illuminating Building

MEMPHIS, TENN.
142 Exchange Building

KANSAS CITY, MO.
1117 Rialto Building

PHILADELPHIA, PA.
319 Perry Building

15-I

AYER & LORD TIE CO. INCORPORATED — AYER & LORD INTERIOR — Always Easy on the Feet — WOOD BLOCKS — RAILWAY EXCHANGE, CHICAGO

*Say you saw it in* THE IRON TRADE REVIEW

are receiving one-third cash from European buyers when orders are taken, and 90 per cent cash when shipments are made from New York. As some of these orders will not be shipped before the first half of next year, any financial stringency that might arise before then would undoubtedly be felt.

## EASTERN STATES

SPRINGFIELD, VT.—Springfield Brass Co. has added an iron foundry to its plant.

SPRINGFIELD, VT.—Fellows Gear Shaper Co. is building an addition.

SPRINGFIELD, VT.—Vermont Snath Co. has moved into the foundry which it recently erected.

SPRINGFIELD, VT.—Jones & Lamson Machine Co. has let contracts for the erection of a new brick and concrete, 1-story addition, 120 x 125 feet. The building will be employed as a hardening shop and a stock department.

WATERBURY, CONN.—Scovill Mfg. Co., maker of brass and copper goods, has purchased 20 acres which will be held in reserve for any future extensions the company may decide to erect.

NEW YORK.—Car Lighting & Power Co. has purchased the entire plant of the Crane Motor Co. at Bayonne, N. J., and will occupy the buildings this week.

NIAGARA FALLS, N. Y.—Niagara Falls Power Co. is preparing to spend about $1,000,000 to bring the plant to capacity by the installation of three more units.

OLEAN, N. Y.—City will construct a bridge over the Allegheny river at Eleventh street; A. G. Harvey is superintendent of streets.

ALTOONA, PA.—Pennsylvania Railroad is receiving bids for a large double housing multiple punch, for its Altonoa shops.

BEAVER FALLS, PA. — Moltrup Steel Products Co., manufacturer of cold drawn specialties, is erecting a 60 x 250-foot addition to its plant for the manufacture of high grade crank shafts. The building will be of brick, steel and concrete and will house considerable machinery, a large part of which, including grinders, lathes, etc., is being purchased in the open market.

BERLIN, PA.—Berlin Smokeless Coal & Clay Mining Co. has been incorporated to manufacture coke and by-products; $25,000 capital stock; by A. J. Hillegas, Berlin, W. H. Miller, D. J. Hillegas and J. A. Hillegas, Fairhope, Pa.

BRADDOCK, PA.—The Elks will erect a $20,000 club house.

DUBOIS, PA.—About $40,000 has been subscribed for erecting the Maple avenue hospital; William Menzie is chairman of the hospital board.

EAST PITTSBURGH, PA.—Borough will build a 3-story municipal building; C. F. Hutchins, architect, Park building, Pittsburgh, has the plans.

EDDYSTONE, PA.—Baldwin Locomotive Works has been granted authority to erect a pier in the Delaware river, accommodating vessels drawing 26 feet.

ERIE, PA.—Erie Trailer Mfg. Co. has been incorporated to manufacture trailers for automobiles and trucks; capital stock $100,000; by H. A. Wilburn, C. C. Leon and Frank J. Behrens.

FAIRVIEW, PA.—Ohio township citizens contemplate erecting a new high school.

FRANKLIN, PA.—French Creek Foundry Co. will rebuild plant recently damaged by fire.

FREEMANSBURG, PA. — Wm. Shimer, Son & Co. have prepared plans for a new plant consisting of three buildings, 75 x 245 feet, 75 x 160 feet, and 75 x 100 feet, respectively, one and two stories.

GERMANTOWN, PA.—American Ice Co. has prepared plans for an extension which will add about 130,000 square feet of floor space to the present structure.

HARRISBURG, Pa.—Montgomery & Co., through Kelker & Johnson, architects, Union Trust building, are taking side bids on a 3½-story, concrete and brick, 74 x 111-foot warehouse. Steam heating system, steel sashes, elevators, etc., will be installed.

INDIANA, PA.—An addition to the Indiana State Normal school, to cost $50,000, is contemplated; ground has been broken.

JOHNSTOWN, PA.—A. C. Shand, architect for the Pennsylvania Railroad Co., is receiving bids for the substructure for a passenger station and shelters.

LEBANON, PA.—A. A. Richter, of Reading, is preparing plans for a new high school, 198 x 198 feet.

MONONGAHELA, PA.—Yohe Bros. have been awarded a contract for erecting a municipal building, to cost $25,000.

NATRONA, PA.—George Shenk & Co., Butler, Pa., have been awarded a contract for erecting a public school, to cost $34,500.

NEW CASTLE, PA.—Federal Radiator Co., which took over the plant of the Penn Motor Co. to manufacture steam and hot water radiators, is erecting several auxiliary buildings to increase capacity.

OIL CITY, PA.—S. C. Boquin has been awarded a contract for the construction of a brick and reinforced concrete car barn, 38 x 150 feet, with a 16 x 150-foot wing for the Citizens' Traction Co.

OSCEOLA MILLS, PA.—Osceola Car Co. has been incorporated to manufacture railroad and Mine Cars; $5,000 capital stock; by C. A. Rickenbaugh and John Sheriff, Osceola Mills, and C. H. Rowland, Philipsburgh, Pa.

PHILADELPHIA.—Hess-Bright Mfg. Co., Front and Erie avenue, has prepared plans for a 1-story shop, 40 x 180 feet.

PHILADELPHIA.—Southwark Foundry & Machine Co., Fourth street and Washington avenue, has plans for alterations of its shop and office, estimated to cost $6,000.

PITTSBURGH.—Department of public safety will remodel engine houses Nos. 18, 32 and 33.

PITTSBURGH.—Pittsburgh Coal Co., it is unofficially reported, may erect a number of beehive coke ovens.

PITTSBURGH.—Carnegie Steel Co. has sent out inquiries for three 5-ton electric cranes for installation in the Schoen Steel Wheel Works, at McKees Rocks, Pa.

PITTSBURGH. — W. H. Miller has purchased the property of the York Bridge Co., York, Pa., but has not announced the plans for future operation.

PITTSBURGH. — Aetna Explosives Co., which has completed the erection of four plants in this district, is buying considerable equipment for the manufacture of explosives.

PITTSBURGH.—Pittsburgh Steel Car Co., recently incorporated, has purchased 100 acres near Shenango, Pa., where a modern plant for building steel cars will be erected.

PITTSBURGH.—C. D. Cooley & Co., architects, are preparing plans for a cold storage plant, to be erected in Baltimore, Md. Bids close Oct. 1.

PITTSBURGH.—C. W. Haggart, Fourth avenue, Pittsburgh, has been awarded a contract for repairing approaches to bridge No. 6 over the Youghiogheny river by Allegheny county commissioners.

PITTSBURGH.—Republic Electric & Mfg. Co., Jenkins arcade building, plans to build a 4-story factory, 54 x 117 feet, to cost $200,000; H. Hornsbostel, Pittsburgh, is the architect.

PITTSBURGH.—Carnegie Steel Co. is inquiring for six motor-driven lathes ranging from 24 inches to 36 inches and two belt-driven, 30 inch lathes, with complete equipment; company also wants a large hydraulic press.

PITTSBURGH. — Contracts have been awarded by the International Oxygen Co., New York City, for the construction of the first of several manufacturing plants in the Pittsburgh district for the manufacture of hydrogen and oxygen gas. Richard Irwin, architect and engineers for the company, will have charge of the work. A 1-acre site has been purchased at Verona, where the first plant will be erected.

READING, PA.—Carpenter Steel Co., in addition to rebuilding its heat treating department and erecting one new annealing furnace, has plans under consideration for rebuilding its carpenter shop and pattern storage department. Another improvement the company is getting under way is the installation of a water purification plant which will be employed to remove coal dust and other solid impurities from water taken from the Schuylkill river. Harold C. Stevens, New York, designed the plant which will embrace a 60,000-gallon steel tank.

SHARON, PA.—The American Steel & Wire Co., which recently installed 20 barb wire machines in its plant here, will add more wire drawing equipment.

SHARPSBURG, PA.—St. Mary's Roman Catholic church will erect a modern edifice, to cost $100,000.

TROY, PA.—Thomas Coupling Co., located at Warren, Pa., will move to Troy in September. A new building with increased facilities will be erected.

UNIONTOWN, PA.—C. W. Haggard, Pittsburgh, has been awarded a contract to construct the wing wall and abutments and repair several bridges.

UNIONTOWN, PA.—The controllers of Fayette and Westmoreland counties will receive bids until Sept. 28 for the construction of a plate girder bridge with concrete substructure and floor over Jacobs Creek at West Overton.

WASHINGTON, PA.—William F. Blair & Son, Waynesburg, Pa., have been awarded the contract for constructing an armory by the state armory board.

WEST CHESTER, PA.—P. J. McCormick has been awarded a contract for a steel girder bridge over Muddy Run.

WHEATLAND, PA. — Knox Pressed & Welded Steel Co. continues to buy equipment for its new plant which will be ready for operation about Nov. 1; motor driven machinery is specified.

CAMDEN, N. J.—Armstrong Cork Co. will erect a building, 94 x 200 feet.

## CENTRAL STATES

AKRON, O.—Osborn Engineering Co., 740 Engineers building, Cleveland, has completed plans and is taking bids on a 3-story factory building to be erected on east Market street extension, Akron, by the Western Tire & Rubber Co. The building will contain 940,000 feet of floor space. M. O'Neil is president.

CANTON, O.—Tolminson Mfg. Co., Urbana, O., will take over one of the larger buildings of the Aultman plant and will move its machinery to that place. The company manufactures sheet metal products.

CINCINNATI.—Special light equipment will be needed by the William Koehl Co., of Jamestown, N. Y., which is building a branch factory on Hulbert street.

CINCINNATI. — Preliminary plans have been prepared for an underground parking system for automobiles, which, if carried out, will require a large amount of steel and concrete work. The space will be large enough

AGATHON STEELS

## A Few Features of Our Plant

Three 50-ton Open Hearth Furnaces in operation. Four more under construction with all accessories.

Open Hearth Building 563 feet long and 135 feet wide.

Soaking Pit Facilities to correspond with Open Hearth Capacity.

Open Hearth Furnace Doors and Soaking Pit Covers electrically operated.

100-ton Crane in Open Hearth Building.

34-inch Blooming Mill direct coupled to reversing electric motor—largest in America.

All Blooming Mill Auxiliaries motor driven.

Blooming Mill can roll 600 tons of ingots to 4 x 4-inch billets in 12 hours or 750 tons of ingots to slabs.

Main motor driven by direct current furnished by motor-generator set fitted with 30-ton fly-wheel.

Bar and Billet Mill adjoins Blooming Mill. Consists of two three-high, 24-inch, roll stands and one 24-inch bull head, driven by one 1500 H. P. and one 300 H. P. motor.

Laboratory—One of the most modern in the country. Every facility for chemical and physical tests.

Every auxiliary facility.

If you want *high grade steel*, we make the kind *you want.*

# AGATHON STEELS

**"AGATHON" Chrome Nickel**
**"AGATHON" Chrome Steel**
**"AGATHON" Chrome Vanadium**
**"AGATHON" Nickel Steel**
**"AGATHON" Special Analyses**
**"AGATHON" Vanadium**
**"AGATHON" Silico-Manganese**
**"AGATHON" High Carbon**

# THE CENTRAL STEEL COMPANY

**Massillon, Ohio**

**Detroit Office 326-27-28 Ford Bldg., F. Walter Guibert, District Sales Manager.**

*Say you saw it in* THE IRON TRADE REVIEW

for 500 automobiles, and will be built under fountain and government squares.

CINCINNATI.—Fulton-Greuter Engineering Co. has been incorporated; $25,000 capital stock; by H. F. Fulton, H. H. Ragland, Horace A. Reeve, Anthony Koars and H. J. Griffin.

CLEVELAND.—Machine Products Co. has been incorporated; $25,000 capital stock; by R. G. Horsburg, H. L. Horsburg, F. Horsburg, E. H. Browning and J. R. Browning.

CLEVELAND.—W. J. Carter, engineer, 423 Illuminating building, Cleveland, will prepare plans for a factory addition to Dorn & Dutton Co., 2714 East Seventy-ninth street, Cleveland.

CLEVELAND.—E. G. Krause, clerk of board of Cuyahoga county, will receive bids until Sept. 22 for the construction of bridge work according to report No. 3567. W. A. Stinchcomb is the county surveyor.

CLEVELAND.—George H. Smith, architect, Colonial arcade, Cleveland, has prepared plans for and will receive bids on the administration building for White Sewing Machine Co., Cleveland. Building is estimated to cost about $90,000.

CLEVELAND.—G. A. Griebele, manager of the promotion department of Joseph Laronge Co., Williamson building, Cleveland, is in charge of extensive factory improvements in the building at West Seventieth street and Big Four tracks. The property was recently leased to the Lohse Automobile Improvement Co.

DAYTON, O.—City attorney is preparing an additional bond issue of $90,000 for the purchase of land and the construction of bridge over Mad river at Keowee, O.

MASSILLON, O.—Massillon Peerless Drawn Steel Co., which recently increased its capital stock from $100,000 to $200,000, will enlarge the plant on Sippo street and increase its working force. A 60 x 153-foot addition will be built to the main building, and a 20 x 110-foot wire pickling plant, and a 48 x 90-foot straight bar pickling building will be erected. The addition to the main building will be of steel and glass with saw tooth construction. The contract for the steel has been awarded to Massillon Bridge & Structural Co., Massillon, O.

WELLSVILLE, O.—W. C. Murray and E. A. Nesbitt, representing the Pittsburgh Boiler & Tank Co., announce that the company plans to take over the plant of Carroll-Porter Boiler Works.

BURNSVILLE, W. VA.—D. H. Gowing Veneer Co. will erect a plant for the manufacture of veneers. Special equipment, including veneer saws and slicers, will be purchased.

CAMERON, W. VA.—American Automatic Save-a-Life Fender Co. contemplates the erection of a plant.

HUNTINGTON, W. Va.—Federal Zinc & Lead Co. has been incorporated; $200,000 capital stock; by Frank Enslow Jr., Frank Ellington and C. D. Miller.

KEYSER, W. VA.—City plans a $35,000 bond issue to improve water works system; W. C. Pifer is mayor.

WHEELING, W. VA.—County commissioners will repair and erect several new buildings.

WHEELING, W. VA.—Wheeling Steel Casting Co., is running double time and plans to make improvements to increase the capacity. Charles H. Dowler is superintendent.

WHEELING, W. VA.—The Wheeling Sheet & Tin Plate Co., a subsidiary of the Wheeling Steel & Iron Co., will begin the erection of six additional hot mills at Yorkville, O., which will make the mill at that city an 18-mill plant. The addition is included in a program of extensions and improvements, previously mentioned.

HENDERSON, KY.—City plans a power house for the municipal electric light plant. L. F. Hite is superintendent.

WINCHESTER, Ky.—Kentucky River Power Co., Hazard, Ky., plans to spend about $300,000 on a power plant. Buildings that are to be erected will be of steel and concrete. Transmission system will cost about $25,000 and will extend 15 miles.

CRAWFORDSVILLE, IND. — Crawfordsville Electric Light & Power Co. is planning to buy a 1,500-kilowatt turbo-generator with condenser pump, switchboard, and steam heater. F. Miller is superintendent and manager.

ELKHART, IND.—Foster Machine Co. is building an addition.

EVANSVILLE, IND.—Anchor Supply Co., F. A. Davis, superintendent, is having plans prepared for a 5-story addition, 40 x 150 feet. C. Shopbell, 707 Furniture Exchange building, is the architect.

INDIANAPOLIS.—Welman Valve Co. has been incorporated to manufacture gas shut-off valves; $50,000 capital stock; by C. W. Welman, J. E. Bingham and R. R. Ross.

INDIANAPOLIS.—Walter Concrete Machinery Co. has been incorporated; $50,000 capital stock; by C. M. Cooper, P. J. Hawkins and J. H. Wolling.

LA FAYETTE, IND.—General Service Co., Thomas Donahue, general manager and engineer, is to build a $150,000 plant to cost $300,000 when completed. A 2,500-kilowatt unit will be built at once. The ultimate capacity will be 10,000 kilowatts.

TIPTON, IND.—Lake Erie & Western Railway is planning to erect shops at Tipton.

TIPTON, IND.—H. Clauss Shear Co. is planning to erect a 4-story factory 32 x 216 feet.

AMBOY, ILL.—Bids will be received until Sept. 27 by F. N. Vaughan, mayor, for a steel watertank on present tower, which will be made higher.

CHICAGO.—T. J. Campbell, 6241 Ashland avenue, is taking bids on a 1-story machine shop, 50 x 135 feet. A. C. Lund, 810 West 63rd street, is the architect.

CHICAGO.—Edgar S. Frady, president of the Cole Motor Co. of Illinois, will build a 4-story building, 50 x 160 feet at 2326 Indiana avenue, to cost $70,000.

CHICAGO.—Sanitary district of Chicago, 910 South Michigan avenue, will take bids about Oct. 15 on bridges and controlling works on the Calumet-Sag channel near Blue Island.

CHICAGO.—Trustees of the sanitary district are considering the construction of three bridges over the drainage canal at Crawford, Cicero and Harlem avenues.

CHICAGO.—John S. Metcalf Co., 108 South La Salle street, will take bids about Sept. 27, for a grain elevator of 1,000,000 bushels capacity at South Chicago, for the North-Western Railway Co., to be operated by the Armour Grain Co., 208 South La Salle street. Bids will include 1,200 feet of docks and an office building.

DECATUR, ILL.—H. Mueller Mfg. Co., 512 West Cerro Cordo street, is receiving bids on a 1-story factory, 66 x 152 feet. Patten, Holmer & Flynn, 401 Powers building, are architects.

ELGIN, ILL.—Moline Malleable Iron Works, St. Charles, Ill., was damaged by a fire. R. R. Fauntleroy is president.

MOLINE, ILL.—Moline Forging & Mfg. Co. has been incorporated; $12,000 capital stock; by Harry Ainsworth, C. A. Rosborough and Arthur L. Warner.

OTTAWA, ILL.—South Ottawa Threshing Co. has been incorporated to manufacture threshing machines; $15,000 capital stock by W. H. Watts, W. F. Watts and George T. Shute.

ST. CHARLES, ILL.—Moline Malleable Iron Works was damaged recently by a fire.

ALBION, Mich.—Albion Malleable Iron Co. has let a contract for 100 x 200-foot addition to the annealing room. The building will be 30 feet high and of fireproof construction.

BOYNE CITY, MICH.—Flooring plant and planing mill of the W. H. White Co. was damaged by a $175,000 fire.

DETROIT.—Scripps Booth Motor Car Co. has purchased a site and will erect a 3-story fireproof factory building.

DETROIT.—Plans are being prepared for factory for the Detroit Battery Co., 607 Fort street. J. W. Weston is president.

DETROIT.—J. T. Currie is building a saw factory, 60 x 150 feet. Baxter, O'dell & Halpin, 1024 Hammond building, are the architects, and are taking the bids.

DETROIT.—Jiffy Starter Co. has been incorporated to manufacture automobile starters; $15,000 capital stock; by Robert Wachman, Henry Platz and Percy Shekell.

DETROIT.—American Welding Co. has been incorporated to do welding and repairing of all metals; $25,000 capital stock; by M. E. Turrell, C. E. Turrell and G. B. Woollton.

DETROIT.—Fentress-Newton Co. has been incorporated to manufacture motorcycle parts and accessories; $20,000 capital stock; by Frank P. Fentress, Joel O. Sage and R. B. Sage.

DETROIT.—Hasseldahl-Lane Co. has been incorporated to make plumbing and heating specialties; $6,500 capital stock; Henry N. Hassendahl, Charles A. Lane and Joseph H. Pohl.

DETROIT.—The Pennsylvania railroad announces it will enter Detroit at a cost of $20,000,000. The work is in charge of Vice President Atterbury and H. T. Hatch, chief engineer of the Vandalia railroad.

HANTRANK, MICH.—Dodge Bros. are taking figures on a 4-story, pressed steel shop 223 x 400 feet and a 4-story die shop, 50 x 400 feet.

KALAMAZOO, MICH.—F. W. Ballard, of Cleveland, has recommended that bonds for $250,000 be issued for improvements and additions to the municipal electric light plant. Andrew Lenderink is city engineer.

KALAMAZOO, MICH. — Fuller & Son, Pitcher street, are building a factory, four stories, 61 x 101 feet, for the manufacture of automobile parts. G. G. Worden, 801 Kalamazoo building, architect, is taking the bids. Considerable equipment will be purchased.

LANSING, Mich.—Novo Engine Co., builder of gas engines, is erecting a plant addition at Porter and East streets providing 16,000 feet of additional floor space.

MONROE, Mich.—River Raisin Hydro-Electric Co. plans to issue bonds to the extent of $30,000 to be used for increasing the capacity of the plant, near River Raisin. The company has several township franchises and contracts for lighting in the towns of Ida, Mich., Maybee, Mich., Schofield, Mich., Carllton, Mich.

PONTIAC, Mich.—American Forging & Socket Co., recently incorporated, has purchased the plant of Michigan Oak Flooring Co. and will build an addition giving 16,000 foot additional floor space. E. A. Rathbun is president.

CADDO, WIS.—A contract has been let to F. W. Keenay, of Oklahoma City for a $20,000 pumping station, including two 8 x 10 triplex pumps, two 4-inch centrifugal pumps and two 50-horsepower oil engines. J. H. Davis is city engineer.

KEWANEE, WIS.—John E. Molle is organizing the Molle Typewriter Co. with $500,-

000 capital stock and is planning to erect a plant.

MANITOWOC, WIS.—The Oslo Power & Light Co., Oslo, Manitowoc county, has increased its capital stock from $30,000 to $60,000. The company is doubling the output of its hydro-electric plant.

MILWAUKEE.—Milwaukee Engineering & Supply Co. is planning to build a 2-story factory.

MILWAUKEE.—Oil Gas Machine Co. has been incorporated $25,000 capital stock; by Ernest O. Linton, Frank J. Blum and Henry M. Wink.

MILWAUKEE.—Harmon Boiler Equipment Co. has been incorporated; $15,000 capital; by R. B. Brown, R. C. Munsche and A. H. Theierbach.

MILWAUKEE.—Milwaukee Die Castings Co., 108 Manufacturers Home building, is building a 2-story factory building, 50 x 60 feet. A. C. Clas, Colby-Abbott building, is the architect.

MILWAUKEE.—Milwaukee Die Casting Co. will remove to its new plant Nov. 15. New foundry is 50 x 60 feet and will produce die casting, babbitt, brass, bronze, copper and aluminum.

MILWAUKEE.—John G. Wolleager Co. will build a large machine shop addition to its garage at 417-421 Wells street. Building will be 2-story reinforced concrete and brick, 60 x 90 feet.

MILWAUKEE.—Harmon Boiler Equipment Co. has been incorporated; $15,000 capital stock; by R. B. Brown, A. H. Theribach and Richard C. Munsche. R. B. Brown is chief engineer and general manager of the Milwaukee Gas Light Co.

MILWAUKEE.—American-McKenna Process Co., E. J. Tapping, general manager, has tentative plans for a re-rolling mill at Cumberland, Md. It will occupy 75,000 square feet with a mill, power house and tool house. Three electric generators of 150-kilowatt capacity probably will be required.

RACINE, WIS.—The welding and machine shop of the Central Welding & Cutting Co., 950 Douglas avenue, Racine, was seriously damaged by fire. A fireproof shop will be erected at once. Harry Grigg is the owner.

MACON, MO.—Steel Motor Co. is about to equip its plant to manufacture automobiles. The concern has $400,000 capital stock. E. J. Spencer, St. Louis, is president.

PLEASANT HILL, MO.—American Scale Co. is planning to build a plant at Pleasant Hill.

ST. LOUIS.—Green Car Wheel Co. will build a foundry costing $6,000.

ST. LOUIS.—Instanter Heater Co. has been incorporated to manufacture water heating appliances; $100,000 capital stock; by John O. McSalley, A. O. Schrader and John H. Magner.

ST. LOUIS.—Missouri Iron Co., E. F. Goltra, president, is preparing to erect a foundry to cost $500,000. Arthur McKee, 1301 Rockefeller building, Cleveland, is consulting engineer.

NEVADA, IA.—Iowa Furnace Co. has brought the plant of the Lennox Machine Co. at Marshallton, Ia., and will consolidate them. W. J. Heald is president.

PERRY, IA.—Iowa Railway & Light Co., Cedar Rapids, is planning to rebuild the electric plant at Perry at a cost of $60,000. William G. Davis, Cedar Rapids, is president and general manager.

MANKATO, MINN.—City has retained Donald Price of Omaha, Neb., to prepare plans for a 560-foot reinforced concrete bridge over the Minnesota river, to cost not over $80,000.

## SOUTHERN STATES

JACKSONVILLE, FLA. — Dixie Metal Specialty Co. has been incorporated to manufacture charcoal stoves; $10,000 capital stock; 000 capital stock; by W. J. Savage, F. P. Robinson and A. B. Day.

AFTON, OKLA. — County commissioners have voted $85,000 in bonds to build bridges.

OKLAHOMA CITY, OKLA.—Southwestern Power, Light & Railway Co., W. T. Croslen president, 406 Security building, is preparing to build three hydro-electric plants costing $1,000,000, to develop 23,500 horsepower. Construction will begin in October and machinery will be needed then. Further construction of hydro-electric plants will bring the power production to 75,000 horsepower. The company is incorporated with $12,000,000 capital.

TULSA, OKLA.—County commissioners of Tulsa county have let a contract to the Missouri Valley Bridge Co., Leavenworth, Kan., for a $155,000 reinforced concrete bridge of 18 spans.

## WESTERN STATES

LAUREL, NEB.—Bonds for $12,000 have been voted for a municipal electric light plant.

SOUTH HAVEN, KAS.—South Haven Electric Light Co. will install an additional generating unit and needs a 25-horsepower oil engine and a 30-kilowatt generator. J. R. Britton is engineer.

GULFPORT, MISS.—L. N. Dantzler Foundry & Machine Works will install equipment for turning out shrapnel shells.

PRENTICE, MISS.—Prentice Electric Light & Mfg. Co. is planning to install a 40-horsepower oil engine.

WESSON, MISS.—City has engaged M. L. Culley, Jackson, Miss., to prepare plans and specifications for an electric light and waterworks plant.

DENNISON, TEX.—Citizens will vote soon on issuing $50,000 in bonds for a reinforced concrete viaduct connecting North and South Dallas.

ALTON PARK, TENN.—Chattanooga Gas & Coal Products Co. will build a benzol plant for which plans are being prepared.

KNOXVILLE, TENN.—Robinson Balance Slide Valve Co. has been incorporated; $150,-

## Sixteen Opportunities to Increase Your Business

*Lucey Mfg. Corporation, 233 Broadway, New York City, is asking bids on 100 18-inch x 7-foot screw cutting engine lathes.*

*Bureau of supplies and accounts, Washington, D. C., will receive bids Dec. 1 on a 44-inch boring mill for Boston, and on Oct. 12 will receive bids on a 12-foot boring and turning mill for the Washington navy yard.*

*Pennsylvania railroad has issued an inquiry for a 40-ton gantry crane for installation at the Altoona, Pa., shops.*

*South Haven Electric Light Co., South Haven, Kas., will install an additional generating unit and is in the market for a 25-horsepower oil engine and a 30-kilowatt generator. J. R. Britton is the engineer.*

*American Multigraph Co., East Fortieth street and Kelly avenue, Cleveland, O., is in the market for several automatic, multiple spindle, 1¼-inch screw machines.*

*Henry Vogt Machine Co., Louisville, Ky., is in the market for a 4-column 1,000-ton hydraulic press. Other equipment will probably be purchased later.*

*Carlisle Electric Light & Power Co., Carlisle, Ky., will purchase an ice machine of 20-tons capacity, for installation by April 1, 1916.*

*Southwestern Power, Light & Railway Co., Oklahoma City, Okla., is preparing to build three hydro-electric plants to cost $1,000,000 to develop 23,500 horsepower. Construction will begin in October and machinery and equipment will be needed at that time. Further construction of hydro-electric plants will bring the power production up to 75,000 horsepower. The company is incorporated with $12,000,000 capital stock. W. T Croslen, 406 Security building, Oklahoma City, is president.*

*Aetna Explosives Co., Pittsburgh, which has completed the erection of four plants, is buying considerable equipment for the manufacture of explosives.*

*D. H. Gowing Veneer Co., Burnsville, W. Va., will erect a plant for the manufacture of veneer. Special equipment including veneer saws and slicers will be purchased.*

*Central Steel Co., Massillon, O., which recently completed an open hearth steel plant will increase the capacity of the plant. Cranes, ladles, ingot buggies, etc., will be purchased.*

*L. N. Dantzler Foundry & Machine Works, Gulfport, Miss., will install equipment for the manufacture of shrapnel shells.*

*Bids will be received until Oct. 1 by John C. Work, mayor, of Ord, Neb., for the construction of a $22,000 electric light plant. Bruce, Standeven & Boynton, 430 Bee building, Omaha, Neb., are the engineers.*

*A. G. Howard, manager of the municipal electric light plant, Tekamah, Neb., plans the purchase of a 150-harsepower corliss engine, two boilers, and a 100-kilowatt generator and switchboard.*

*Crawfordsville Electric Light & Power Co., Crawfordsville, Ind., plans the purchase of a 1,500-kilowatt turbo-generator, with condenser pump, switchboard, steam heater, etc. F. Miller is superintendent and manager.*

# IRON AND STEEL PRICES

**Corrected up to Tuesday noon**

## PIG IRON

(Delivery to Dec. 31.)

| | |
|---|---|
| Bessemer, valley | $16.00 |
| Bessemer, Pittsburgh | 16.95 |
| Basic, Pittsburgh | 15.45 to 15.95 |
| Basic, eastern Pa. | 17.00 |
| Malleable, Pittsburgh | 15.45 to 15.95 |
| Malleable foundry, Chicago | 14.00 |
| Malleable foundry, Philadelphia | 15.75 to 16.25 |
| Malleable foundry, Buffalo | 14.75 to 15.00 |
| No. 1X foundry, Philadelphia | 16.75 to 17.00 |
| No. 2 foundry, Pittsburgh | 15.45 to 15.95 |
| No. 2 foundry, valley | 14.50 to 15.00 |
| No. 2 foundry, Cleveland | 14.50 to 15.00 |
| No. 2 foundry, Ironton | 14.00 to 14.50 |
| No. 2 foundry, Chicago | 13.50 to 14.00 |
| No. 2X foundry, Philadelphia | 16.25 to 16.75 |
| No. 2X fdy., N. J. tidewater | 16.25 to 16.75 |
| No. 2X foundry, Buffalo | 14.75 to 15.00 |
| No. 2 plain, Philadelphia | 15.50 to 15.75 |
| No. 2 plain, N. J. tidewater | 15.75 to 16.25 |
| No. 2 plain, Buffalo | 14.50 to 14.75 |
| No. 2 southern, Birmingham | 11.00 to 11.50 |
| No. 2 southern, Cincinnati | 13.90 to 14.40 |
| No. 2 southern, Chicago | 14.50 to 15.00 |
| No. 2 southern, Phila. delivery | 15.50 to 16.00 |
| No. 2 southern, Cleveland | 15.00 to 15.50 |
| No. 2 south'n, New York docks | 15.50 to 16.00 |
| No. 2 southern Boston, docks | 15.50 to 16.00 |
| No. 2 south. interior, New Eng. | 16.50 to 17.50 |
| No. 2 southern, St. Louis | 15.90 |
| Virginia No. 2X furnace | 13.25 to 13.50 |
| Virginia 2X, Philadelphia | 16.00 to 16.75 |
| Virginia 2X, Jersey City | 16.35 to 17.10 |
| Virginia 2X, Boston points | 16.50 to 17.25 |
| Gray forge, eastern Pa. | 15.00 to 15.25 |
| Gray forge, Pittsburgh | 14.95 to 15.20 |
| Gray forge, Birmingham | 9.00 |
| Silveries, 8 per cent, Jackson, O. | 17.00 to 17.50 |
| Silveries, 5 per cent Birmingham | 13.00 |
| Silveries, 5 per cent, Chicago | 17.85 to 18.00 |
| Standard low phos., Phila. | 24.00 to 24.50 |
| Lebanon low phos., furnace | 19.00 to 20.00 |
| Low phos., Pittsburgh | 24.00 to 24.50 |
| Charcoal, Lake Superior, Chgo., Nos. 1 to 4 | 15.75 to 16.25 |
| Charcoal, Buffalo | 16.75 to 18.25 |
| Charcoal, Birmingham | 21.50 |

## IRON ORE

**Lake Superior Ores.**
**(Lower lake ports.)**

| | |
|---|---|
| Old range Bessemer, 55 per cent. | $3.75 |
| Mesabi Bessemer, 55 per cent. | 3.45 |
| Old range, non-Bess., 51½ per cent. | 3.00 |
| Mesabi non-Bessemer, 51½ per cent. | 2.80 |

**Foreign Ores.**
**(Per unit Philadelphia.)**
(Prices nominal.)

| | |
|---|---|
| Foreign Bess., 50 to 65 per cent. | 8 to 8½ |
| For'n non-Bes., 50 to 65 per cent. | 8 to 8½ |

## COKE

(At the ovens)

| | |
|---|---|
| Connellsville furnace | $1.70 to 1.75 |
| Connellsville fur. contr. (nom.) | 1.90 to 2.00 |
| Connellsville foundry | 2.25 to 2.60 |
| Connellsville fdy. contr. | 2.35 to 2.60 |
| Wise county furnace | 2.00 to 2.25 |
| Wise county foundry | 2.40 to 2.60 |
| Pocahontas furnace | 2.00 to 2.50 |
| Pocahontas foundry | 2.25 to 2.50 |
| New River, foundry | 2.50 to 3.25 |
| New River, furnace | 2.25 to 2.50 |

## FERRO-ALLOYS

| | |
|---|---|
| Ferro mang., furnace (prompt) | 110 to 125 |
| Ferro mang., Balti. (future) | 100.00 |
| Spiegeleisen 20 per cent, furnace | 28.00 |
| Ferro-silicon, 50 per cent, Pbgh. | 73.00 to 75.00 |
| Ferro-silicon, 50 per cent, Phila. | 73.00 to 75.00 |
| Ferro-sil., 12 to 13 per cent. | 22.00 |
| Ferro-sil., 11 to 12 per cent. | 21.00 |
| Ferro-sil., 10 to 11 per cent. | 20.00 |
| Ferro-sil., 9 to 10 per cent. | 19.00 |
| (Ferro-silicon quoted at furnace Ashland, Jackson and New Straitsville.) | |
| Ferro-carbon titanium, carloads, per lb. | 8c to 12½c |
| Ferro vanadium, Pbgh. per lb. alloy | 2.25 to 2.30 |
| Ferro tungsten, per lb. alloy, nom. | 3.00 to 3.50 |
| Ferro chrome, 4 to 6 per cent per lb., Niagara Falls | 20c |

## SEMI-FINISHED STEEL

| | |
|---|---|
| Open hearth billets, Phila. | $30.00 to 32.00 |
| Forging billets, Phila. | 34.00 to 38.00 |
| Forging billets, Pbgh. | 33.00 to 35.00 |
| Forging billets, Chgo. | 30.00 |

## Freight Rates via Panama Canal

Rates on finished materials, including plates, shapes, bars, wire, nails, etc., to Pacific coast points via Panama canal, per 100 lbs., in carload lots, exclusive of insurance and dockage.

| | |
|---|---|
| From New York | $0.40 |
| From Pittsburgh | .619 |
| From Youngstown | .619 |
| From Niles | .619 |
| From Wheeling | .619 |
| From Steubenville | .619 |
| From Johnstown | .604 |
| From Coatesville | .545 |
| From Steelton | .555 |
| From Bethlehem | .529 |
| From Cleveland | .65 |
| From Chicago | .765 |

| | |
|---|---|
| Wire rods, Pittsburgh | $28.00 to 30.00 |
| Bess. bill., Youngstown | 24.00 to 25.00 |
| Open hearth billets, Youngstown | 25.00 to 26.00 |
| Bessemer billets, Pittsburgh | 25.00 |
| Open hearth billets, Pittsburgh | 26.00 |
| Bess. sheet bars, Youngstown | 25.00 |
| Op. h'th sheet bars, Youngstown | 25.00 to 26.00 |
| Bess. sheet bars, Pittsburgh | 25.00 to 26.00 |
| Op. h'th sh. bars, Pbgh. | 26.00 to 26.50 |
| Muck bar, Pittsburgh | 27.00 to 28.00 |

## RAILS AND TRACK MATERIAL

| | |
|---|---|
| Stand. Bess., rails, Pbgh. | 1.25c |
| Stand. open-hearth rails, Pbgh. | 1.34c |
| Lgt. rails, 8 to 10 lbs., Pbgh. & Chgo. | 1.40c |
| Lgt. rails, 12 to 14 lbs., Pbgh. & Chgo. | 1.35c |
| Lgt. rails, 16 to 20 lbs., Pgh. & Chgo. | 1.30c |
| Lgt. rails, 25 to 45 lbs., Pbgh. and Chgo. | 1.25c |
| Relaying rails, standard, Pbg. & Chgo. | $23.00 to 24.00 |
| Relaying rails, light, Chgo. | 21.50 to 22.50 |
| Angle bars, st. sect, Pbgh. base. | 1.50c |
| Angle bars, st. sections, Chicago | 1.50c |
| Spikes, railroad, Pbgh. | 1.50c to 1.55c |
| Spikes, railroad, Chgo. | 1.65c to 1.70c |
| Track bolts, Pbgh. | 2.00c to 2.10c |
| Track bolts, Chgo. | 2.10c |
| Tie plates, Chgo. | 30.00 |

## Freight Rates, Pig Iron

| | |
|---|---|
| Mahoning and Shenango valleys to:— | |
| Cleveland | $0.95 |
| Newark, N. J. | 2.98 |
| Boston | 3.18 |
| Philadelphia | 2.78 |
| Pittsburgh | .95 |
| St. Louis | 3.18 |
| Buffalo to:— | |
| Albany, N. Y. | $1.26 |
| New England (all rail) | 2.58 |
| New York and Brooklyn (all rail) | 2.58 |
| New York and Brooklyn (by canal) | 1.25 to 1.60 |
| Virginia furnaces to:— | |
| Boston docks (r. and w.) | $3.05 |
| New England (all rail) | 3.25 |
| New York dock (r. and w.) | 2.88 |
| Birmingham, Ala., to:— | |
| Cincinnati | $2.90 |
| Chicago | 4.00 |
| Cleveland | 4.00 |
| Louisville, Ky. | 2.65 |
| New York (all rail) | 6.15 |
| New York (rail and water) | 4.25 |
| Philadelphia (all rail) | 5.20 |
| Philadelphia (rail and water) | 4.00 |
| Pittsburgh | 4.90 |
| Savannah, Ga. | 2.75 |
| Chicago, to:— | |
| Des Moines | $2.80 |
| Milwaukee | .50 |
| Moline, Ill. | 1.40 |
| Omaha | 3.58 |
| St. Louis | 1.58 |
| Ironton and Jackson, O., to:— | |
| Chicago | $2.54 |
| Cincinnati | 1.26 |
| Cleveland | 1.62 |
| Detroit | 1.81 |
| Indianapolis | 1.58 |

## SHAPES, PLATES AND BARS

| | |
|---|---|
| Structural shapes, Pittsburgh | 1.35c |
| Structural shapes, Chgo. | 1.54c |
| Structural shapes, Philadelphia. | 1.509c |
| Structural shapes, New York. | 1.519c |
| Struc. shapes, San Francisco. | 2.00c to 2.05c |
| Tank plates, Chicago | 1.49c to 1.54c |
| Tank plates, Pittsburgh | 1.30c to 1.35c |
| Tank plates, Philadelphia | 1.509c |
| Tank plates, New York | 1.509c |
| Bars, soft steel, Pittsburgh | 1.35c |
| Bars, soft steel, Chicago | 1.54c |
| Bars, soft steel, Philadelphia | 1.509c |
| Bars, soft steel, New York | 1.469c |
| Hoops, carloads, Pittsburgh | 1.40c |
| Bands, Pittsburgh | 1.35c |
| Shafting, Pbgh., contr. car loads | 64 off |
| Bar iron, Chgo. | 1.35c |
| Bar iron, Philadelphia | 1.459c |
| Bar iron, New York | 1.469c |
| Bar iron, Cleveland | 1.30c to 1.40c |
| Bar iron, Pittsburgh | 1.40c |
| Hard steel bars, Chicago | 1.30c to 1.35c |
| Smooth finish, mchy. steel, Chi. | 1.68c |

## SHEETS AND TIN PLATE

| | |
|---|---|
| No. 28, black, Pittsburgh | 1.90c to 2.00c |
| No. 28, black, Chicago | 2.14c to 2.19c |
| No. 28, tin mill, black, Pbgh. | 1.85c |
| No. 28, galvanized, Pbgh. nom. | 3.75c to 4.00c |
| No. 28, galvanized, Chgo. | 3.79c |
| No. 10, blue anld., Pbgh. | 1.50c to 1.60c |
| No. 10, blue, annealed, Phila. | 1.659c to 1.759c |
| Tin plate, 100 lb., coke base. | 3.10c to 3.20c |

## EXTRAS FOR SHEET OR TIN MILL SPECIFICATIONS

(Per hundred pounds.)

| | |
|---|---|
| Single pickled, cold roll, and re-anl. | 30 cents |
| Hot roll'd pick'd and anl., tin mill | 25 cents |
| Full pickl'd, cold rolled and re-anl. | 50 cents |
| Auto sheets | 75 cents |
| Blued stove pipe stock | 10 cents |
| Range steel | 30 cents |
| Re-squaring | 10 cents |
| Roller leveling | 10 cents |
| Patent leveling and re-squaring | 35 cents |
| Oiling sheets | 10 cents |
| Deoxidizing | 10 cents |
| Lime finish | 10 cents |
| Open-hearth stamping steel, free from mill scale | 55 cents |
| Special open hearth deep stpg. steel free from mill scale | 80 cents |
| Extra deep special auto body stock | $1.25 |
| Ext. for 28 gage ov. 32 to 36-in. wide | 10 cents |
| No reduction for sheets not annealed. | |

The above extras apply on both sheet and tin mill specifications, at the same rate.

## IRON AND STEEL PIPE

(Pittsburgh.)

| | Black. Butt-weld. | Galv. Butt-weld. |
|---|---|---|
| Steel, ¾ to 3 inches | 79 | 63½ |
| Iron, ¾ to 2½ inches | 71 | 52 |
| | Lap-weld. | |
| Steel, 2½ to 6 inches | 78 | 62½ |

## BOILER TUBES

| | |
|---|---|
| Steel, 3½ to 4½ inches l. c. l. | 72 |
| Iron, 3½ to 4½ inches l. c. l. | 61 |

## WIRE PRODUCTS

(Retailers' price 5 cents above jobbers' quotation.)

| | |
|---|---|
| Wire nail jobbers, Pittsburgh | $1.65 |
| Plain wire, jobbers, Pittsburgh | 1.50 |
| Galvanized wire, jobbers, Pbgh. | 2.20 |
| Polished staples, Pbgh. | 1.80 |
| Galvanized staples, Pbgh. | 2.50 |
| Barb wire, painted, jobbers, Pbgh. | 1.80 |
| Barb wire, galv., jobbers, Pbgh. | 2.50 |